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Also in This Issue

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- Ease of Use, Page 114
- Desktop Publishing, Page 124



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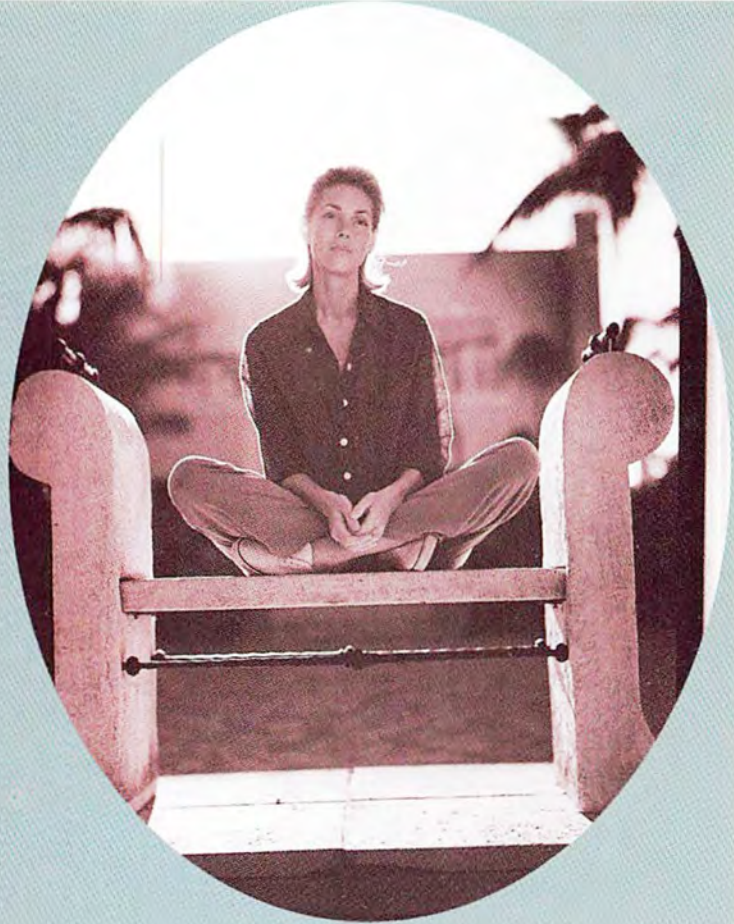
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Just in case.

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Sentence with
An abbreviation
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Margins
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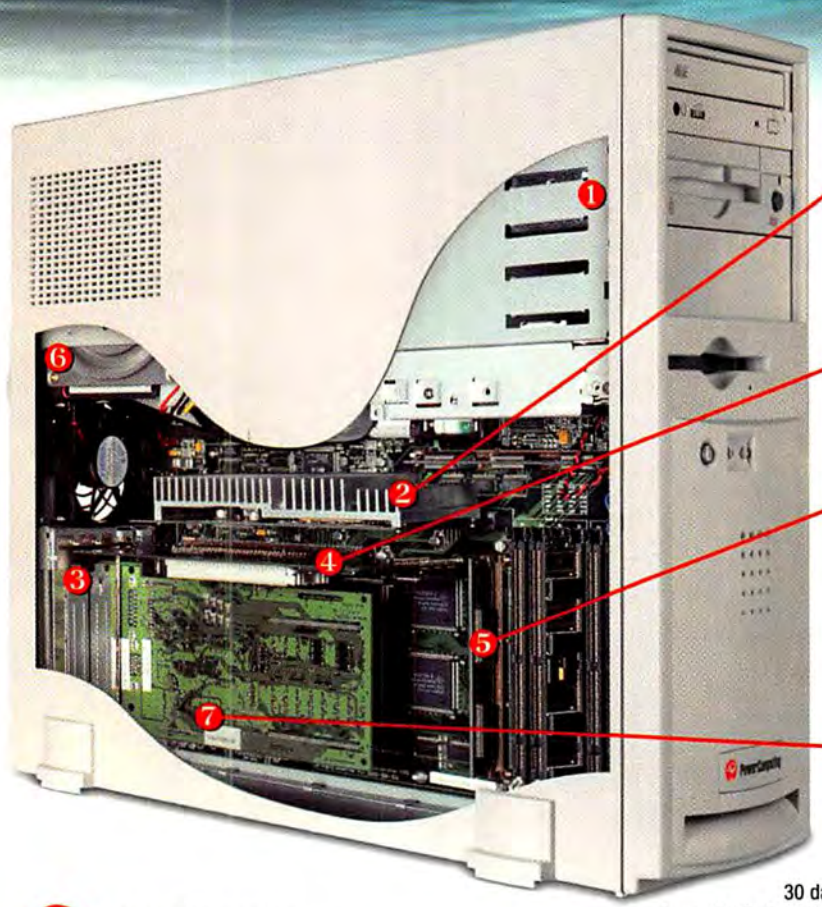
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Features

96 The Best Mac for the Job
BY GALEN GRUMAN Macworld Lab puts together six perfect systems for today's users, from business execs to road warriors.

110 How Each Mac Stacks Up
BY MACWORLD LAB STAFF Expanded, real-world benchmark data on each perfect system.

114 Is the Mac Still the Easiest to Use?
BY HOWARD BALDWIN We all know what they say, but is Windows 95 really as easy to use as a Mac? We roll up our sleeves for some in-depth usability testing to find out.

124 The Publishing Face-Off
BY OLAV MARTIN KVERN AND STEVE ROTH Desktop publishing has long been the cornerstone of Mac superiority. Is the Mac still the reigning king of DTP, or is it time to hand the crown over to Windows 95?

News

38 Macintosh Quality #1
Why today's computer users rate Apple number one.

41 Internet Watch
Better sound with RealAudio 2.0 • NetCruiser for Mac, and more.

Special Report
46 Digital Video Gets Religion
High-end PCI-based digital video cards finally ship.

Exclusive
47 More PowerBook Woes
Factory fire and circuitry problems continue to plague the 5300's.

48 Systems Watch
Copland, OpenDoc move closer to reality, and more.



Opinion

19 Letters

27 State of the Mac
BY ADRIAN MELLO *Macworld*'s new look.

33 The Desktop Critic
BY DAVID POGUE Finding love, happiness, and a good phone line overseas.

268 Viewpoint
BY CARYN JAMES Hollywood's new villain.



A wealth of support for Apple's ColorSync 2.0 color-management software in News, page 45.



Is the Mac still the best DTP platform? Our experts debate, page 124.

Secrets

135 **Secrets of the Find File Command**
BY JOSEPH SCHORR A smorgasbord of Find File features puts your Mac to work for you.

139 **Quick Tips**
BY LON POOLE Tips, tricks, and shortcuts.

145 **NetSmart**
BY MATTHEW HAWN Click and wait, click and wait—the culprits behind online delays.

Media

151 **Media**
BY JIM HEID What's in store for video, audio, and interactive production.

154 **Publishing Workshop**
BY DAVID BLATNER The tao of resolution.

162 **Graphics Workshop**
BY CATHY ABES How to render realistic terrains with KPT Bryce.

Buyers' Tools

165 **Full-Size Color Displays**
MW LAB
BY PETER M STOLLER Our panel of experts judge 13 two-page monitors for brightness, contrast, and color to separate the performance winners from the pack.

169 **Consumer Advocate**
BY TOM NEGRINO Up close and personal with user groups, and the services that can save you money and hassles.

175 **Star Ratings**
Macworld's ratings for hundreds of hardware and software products at a glance.



A machine we love even more than the Power Mac 7500—the PowerWave 604, reviewed and tested, page 54.

ON THE COVER
Photo by Paul Franz-Moore

Reviews

54 ★★★★/7.6 **PowerWave 604/120;**
★★★★/7.6 **PowerWave 604/132;**
★★★★/7.7 **PowerWave 604/150**
NuBus/PCI clone systems

56 ★★★★/8.9 **Speed Doubler 1.0.2**
Operating system enhancement

57 ★★★★/8.3 **Kai's PowerTools 3.0**
Photoshop plug-ins

58 ★★★/5.9 **PowerBook 5300c**
Portable computer

61 ★★★/6.7 **WordPerfect 3.5**
Word processor

62 ★★★★/8.6 **PressView 21 SR**
Professional-quality display

65 ★★★★/8.3 **Quicken Deluxe 6**
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66 ★★★★/8.0 **Claris Impact 2.0**
Business-graphics software

68 ★★★/6.0 **Desktop GlidePoint;**
★★★★/7.0 **QuePoint II;**
★★/4.3 **TouchPad**
Input devices

71 ★★★★/7.3 **DrawTools 1.0**
Graphics extensions collection

73 ★★★★/7.2 **QX-Tools 1.0**
Quark XTension collection

74 ★★★★/8.1 **Macromedia FreeHand 5.5**
Draw program

77 ★★★/5.4 **HP CopyJet M**
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78 ★/1.5 **Chagall 2.0.2**
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81 ★★★/6.2 **At Ease 3.0**
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81 ★★★★/8.3 **StatView 4.5**
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82 ★★★★/7.1 **SPSS 6.1**
Statistical software

85 ★★★/6.9 **Boris Effects 1.01**
Video-effects plug-in

85 ★★★/5.0 **Tracer 1.0**
Autotracing software

86 ★★★/5.1 **SCSI PowerPlug II**
Aid for swapping SCSI devices

86 ★★★★/8.4 **SCSI Director Pro 4.0**
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88 ★★★/6.9 **Quicken Family Lawyer 6.0b**
Personal legal software

90 ★★★★/7.5 **Igor Pro 2.0.4**
Scientific graphing system

92 ★★★★/7.0 **Tools Plus 2.6**
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95 ★★★★/8.0 **LS FORTRAN 1.1**
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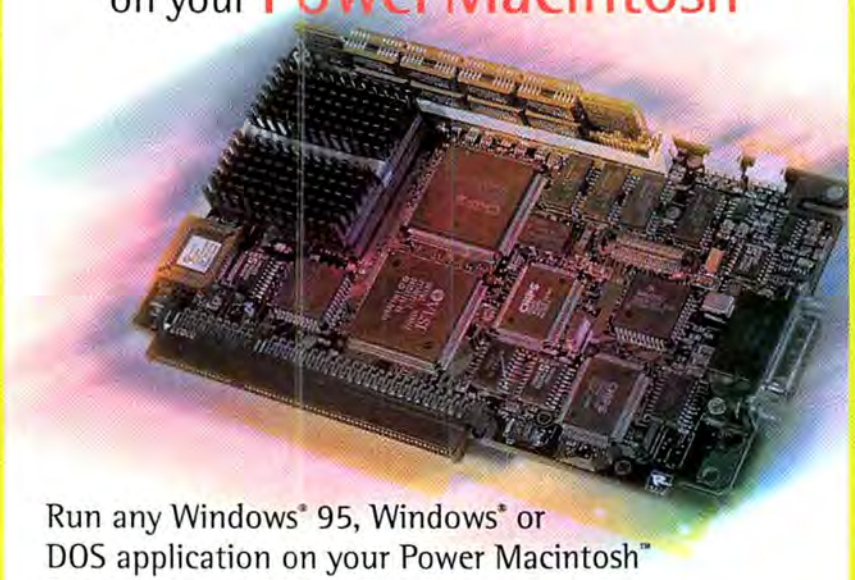
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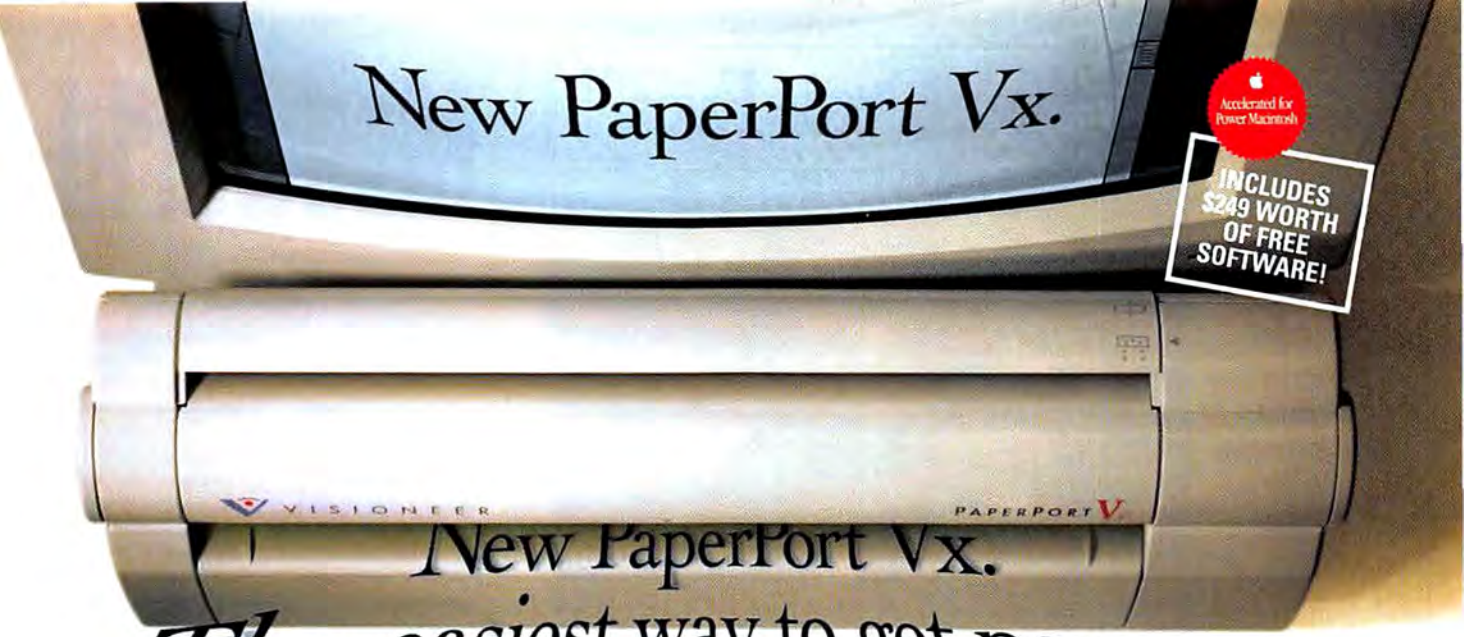
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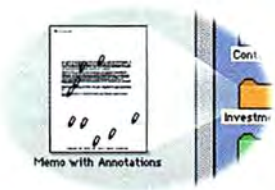
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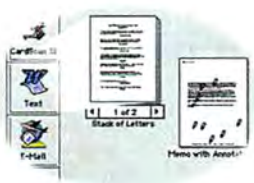
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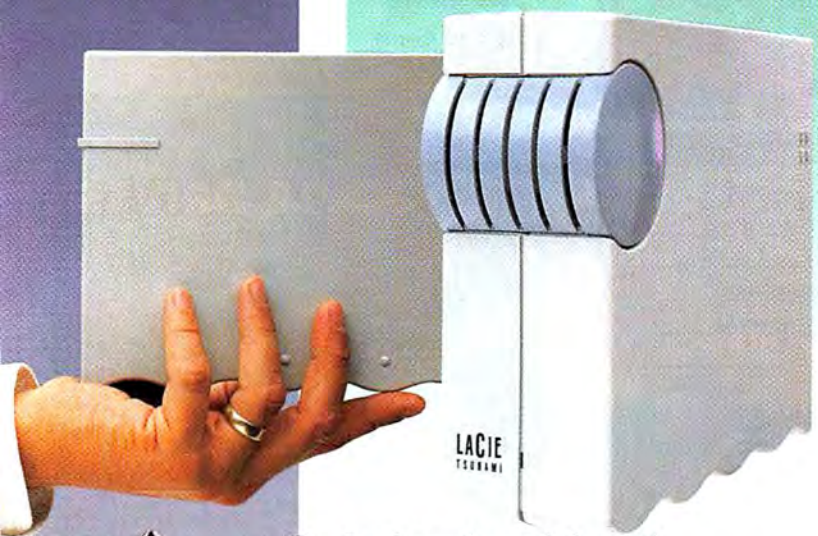
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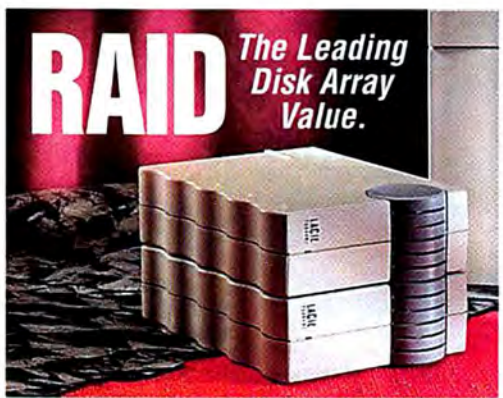
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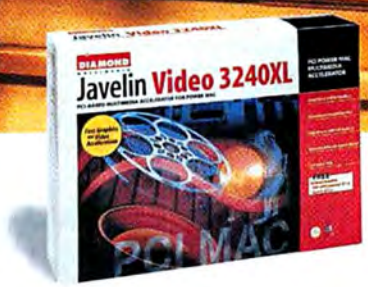
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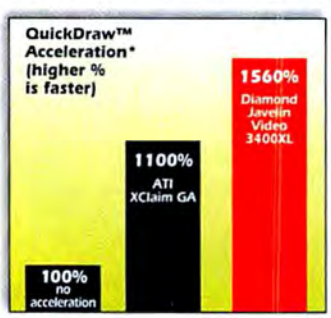
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Circle 83 on reader service card

Letters

Parting Shots

IN READING THE CLOSING REMARKS OF Guy Kawasaki's final column (*Wise Guy*, November 1995), I couldn't help being piqued by *Macworld*'s statement, "Sadly, the noble mission that Guy has accepted on behalf of the Macintosh is incompatible with *Macworld*'s most valued asset—our ability to report on the Macintosh marketplace without bias."

Guy Kawasaki has always been biased toward Apple and Macintosh. In fact, all of his criticisms of Apple, its management, and policies are obviously meant to hold up a mirror and describe the picture in the glass. If Apple wasn't Apple, Guy would have been pretty boring.

You can't be unbiased and you certainly can't be objective, so be fair—let's see what the great Guy can really do. Give Guy the space to tell it like it is.

ROBERT STARK
via America Online

YOU'RE KIDDING. YOU REPLACED me with a lawyer?

GUY KAWASAKI
via eWorld

Copland Letdown

WHAT'S THIS, MY POWERBOOK 520 with PowerPC upgrade won't run Copland? I refer to "Apple Hedges Its OS Bets" (*News*, November 1995), in which you state "Apple has also decided not to make Copland run on 680X0 Macs, with or without PowerPC upgrade cards." I can't believe Apple is going to do this to all of us that bought the 500-series PowerBooks. When I bought my PowerBook I expected to upgrade with the PPC card and have a computer that would last a few years. What I will have is a computer with a "user-interface replacement." Woo hoo, that's what I really want—that, and a swift kick in the head! I hope this is all a false report and Apple isn't going to leave us out in the cold.



DAVID RUSER
via the Internet

I hope you have a good winter coat, Dave.—Ed.

APPLE PUTS ME ON THE BRINK OF outrage, and I suspect a whole bunch of other PowerBook 500–series owners feel the same way. I bought my 520 with the expectation that I could upgrade it to a PowerPC—not because I wanted to be hip, but because I wanted a fast, reliable, mobile Mac. Now Apple is telling us that Copland, the forthcoming OS that's supposed to make the PowerPC sound a fanfare for the common man, isn't going to work on 680X0 machines. If Copland isn't compatible with the PowerBook 500 series when it's finally released next year, then it will be bad news indeed.

DAVID HURLBUT
via the Internet

APPLE ANNOUNCED THAT COPLAND won't run on machines with PowerPC upgrade cards. Only true-blue PowerPC motherboards need apply.

I've got my Quadra box here with the big, blue "Ready for PowerPC" sticker on its side. I don't see any notice "Not Usable with PPC System Software."

PATRICK ATHERTON
via America Online

What Works in Works

THERE IS A CONVERT UPPER- AND lowercase feature in ClarisWorks 4.0 ("Works versus Works," November 1995). Check out the Aa and aA shortcuts.

This long-desired feature is easy to miss. Even the Claris rep at Macworld Expo told me there is no such feature in 4.0. But it's there.

RICHARD GLANTZ
via America Online

Choicest Dirt Kept

I'VE ALWAYS LOVED *THE DESKTOP CRITIC*, but the column on wordplay software absolutely made my day ("Semag Drow," November 1995). Though I can't believe you didn't mention the wonderful anagram maker, Ars Magna II, by Mike Morton, the new version of which is accelerated for Power Mac. Users may cringe at its command-line interface, but it has more features than Karma Manager, including word counts, screen-by-screen

continues

GORDON STUDER

output, and the ability to scroll back.

By the way, you're probably aware that *Macworld Online* is a great "random icon well" and that the people staffing it sometimes go "wild on cornmeal." You also probably know that *Charles Seiter* constantly "researches lit" for a "clearer thesis" and that *Joseph Schorr*'s birth name was really "Hooch Press, Jr." But did you know that the Juice got off because *Judge Lance Ito* secretly attributed the DNA matches to a "genetic O.J. dual"?

JASON STETTEN
via America Online

Don't Skimp on URLs

YOUR REVIEW OF GRABNET 1.0 STATED that a ten-day trial version was available from the company's Web site, yet you did not think to mention the location of the Web site (*Reviews*, November 1995).

I realize that URLs can be located from services such as Lycos and Yahoo, but the point is, I don't want to research such an item. That is why I subscribe to your magazine.

Please, please, please provide appropriate URLs when you mention something that is available on the Internet.

KURT LIEBER
via the Internet

Portable? Like a Console TV

JOSEPH SCHORR'S REVIEW OF APPLE'S excellent new portable printer, the Apple Color StyleWriter 2200, fails to mention two significant shortcomings of this otherwise highly desirable printer (November 1995).

First and foremost, Apple is shipping this *portable* printer with a 120-volt AC, 60Hz power supply, severely limiting its use to the United States and Canada. The norm elsewhere is 240 volts and 50Hz. When I discussed this shortcoming at Macworld Expo with an Apple rep, he assured me that an optional universal power supply was available, but I have been unable to locate a dealer who sells this alleged option.

Second, unlike its big brother, the StyleWriter 2400, this printer does not have AppleTalk. This is another egregious error since many potential buyers of this small printer already have a desktop printer and therefore lack only two essential capabilities: portability and color. If the 2200 offered AppleTalk, this category of buyer could justify buying the printer on the dual basis of adding color to desktop printing capabilities and having a portable printer on the road.

These two shortcomings are all the more onerous since the 2200's principal competitor, the HP DeskWriter 320/340, includes both a universal power supply and AppleTalk.

BILL MCKELVY
via CompuServe

More on Ethics

THANK YOU, ADRIAN MELLO, FOR clarifying *Macworld*'s position on the separation of church and state (editorial and advertising) (*State of the Mac*, November 1995). It is nice to see that some businesses still place ethics before profits. This is especially important in the new medium, the Internet. You have opted to provide your service to your readers at no cost to them, therefore depending only on advertising revenues to fund your site. First, I appreciate the free up-to-the-minute information on Mac products and Mac news. Second, I appreciate the difficult position free access might put *Macworld* in, in terms of being beholden to the almighty ad dollar to sustain the project. All I can say is hold your ground. You have a fabulous product, both in print and in pixel.

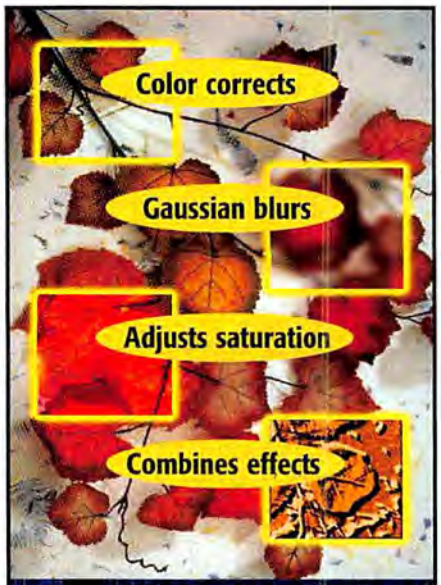
MARTIN TIMUSK
via the Internet

ADRIAN MELLO'S "READER'S BILL OF Rights" should be E-mailed to a few popular weekly and monthly publications I see on the newsstand all the time. Their ethics went out the window a long time ago. Good journalism on any subject is only as good as the journalist. The same can be said for the publisher. But then we the people have the power to cancel subscriptions and go for an honest magazine.

HELEN ROUSSEAU
via CompuServe

HMMM, LET'S SEE IF I HAVE THIS right. Guy Kawasaki is no longer with *Macworld* because he's working as an Apple Fellow? He's owned stock in Bit Jugglers, a failed spreadsheet/database company, and started his own soft-

continues



PHOTOSHOP UNLEASHED

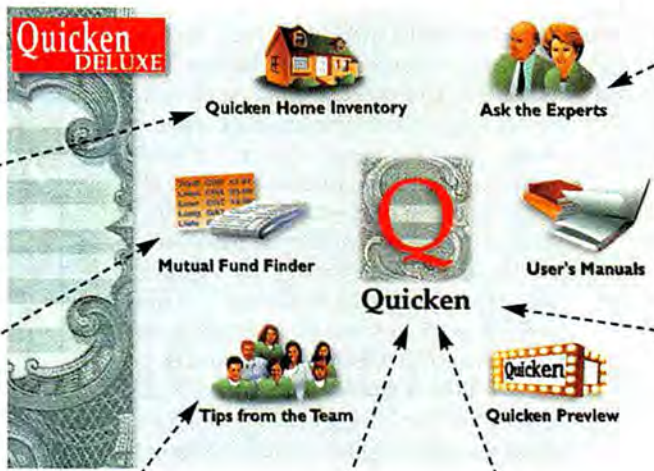
Imagine being able to sharpen or blur an image, emboss in real time or adjust color balance with one mouse click. You could get this type of manipulation by manually entering numbers in Photoshop's custom-filter matrix. But you'd end up spending a lifetime doing what KPT* Convolver™ does in short order. Convolver puts the equivalent of 10,000 filters at your disposal with controls to apply them in any combination. Free yourself from Photoshop's preset filters and customize your own for perfect results each time. Convolver's real-time interface simply invites experimentation while allowing instant comparisons of a range of effects. Says an impressed user: "I've been using Convolver for three days and it allows amazingly precise control...from subtle to great." Don't let your fertile imagination become convoluted, get KPT Convolver today!

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ware publishing company, and you guys give him the ax because he got a job with Apple? Guy has made no secret about his software investments. He has been visiting user groups hawking Emailer for at least the last eight months, and someone *now* decides there is a conflict?

Normally I would take a change like this at face value, but Adrian Mello's column made me think otherwise. I've always read *Wise Guy* to see which direction the Mac was, or should be, taking. I cannot ever recall seeing a product review in Guy's column, nor have I seen any conflict of interest. I always viewed his business pursuits as lending credibility to his opinions. Guy's sole goal seemed to be to tell us when the Mac had no clothes.

JAMES M. BLEIFUS
via eWorld

Resolution Resolution

I AM LOOKING FOR A DEFINITIVE EXplanation of laser printer resolution. When I look at "Color Printers Mean Business" (September 1995), there are six companies that claim 600-dpi or better resolution, but when I check the table, I find resolutions of 600 by 300, 600 by 600, and one 1200 by 300.

In my mind, only the Apple and QMS color lasers have true 600 dpi (600 by 600). Am I on the right track, or is 600 by 300 dpi as good as 600 by 600 dpi? What benefit, if any, does the Xerox have at 1200 by 300? I'd also like to get more information on the vertical versus horizontal dpi numbers and how they do or don't affect the final output.

BRUCE JOHNSON
via the Internet

For the down and dirty on resolution, see Macworld's *new column,* Publishing Workshop, *in the* Media *section of this issue.—Ed.*

World Wide Web, Easy as Pie

JUST WANT TO SAY THAT THE ARTICLE "Build Your Own Home Page" easily got me on the World Wide Web (November 1995). I was having problems displaying my images in a Web Weaver Editor. Mel Beckman's suggestion about getting a GIF converter solved that problem. And his instructions to upload the image and HTML files to the Unix system were straightforward. It's really easy getting set up on the WWW!

Thank you for publishing a worthwhile article.

JIM BRETT
via the Internet

PowerBook Questions

TRIVIA QUESTION: IN A PAST LIFE I used to pack an IBM-compatible notebook computer around with me. Every single time I passed through the X-ray machine at an airport I would have to open the notebook and turn it on to prove that what I had was indeed a harmless computer. More recently I have been toting PowerBooks through airport truth machines, and no one has even so much as raised an eyebrow. No one has asked me to prove that what I have is truly a computer. What gives here? Am I living in a long-running coincidence or is there something about the PowerBook when seen through an airport X-ray machine that makes it clear it is a functioning computer, nothing more, nothing less?

Real question: The keys on the 500-series PowerBooks can be sticky if not hit precisely dead center. Is there a stiffener frame on the market that fits under the keyboard without squashing or damaging the guts hiding under it? If there is, I absolutely, positively want to know about it. Barring that, is there anything I can do to make the keyboard more responsive and less temperamental?

STEVE MANKOWSKI
Saint Louis, Missouri

I'm stumped. Maybe that friendly Apple icon lulls airport security—or maybe we should all reconsider the advantages of travel by rail.

As for a product to stiffen the keys on your PowerBook—once again, I'm stumped. Readers?—Ed. **m**

Letters should be sent to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (**70370,702**), MCI Mail (**294-8078**), America Online (**Macworld**), AppleLink (**Macworld1**), or via the Internet (**letters@macworld.com**). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld.*

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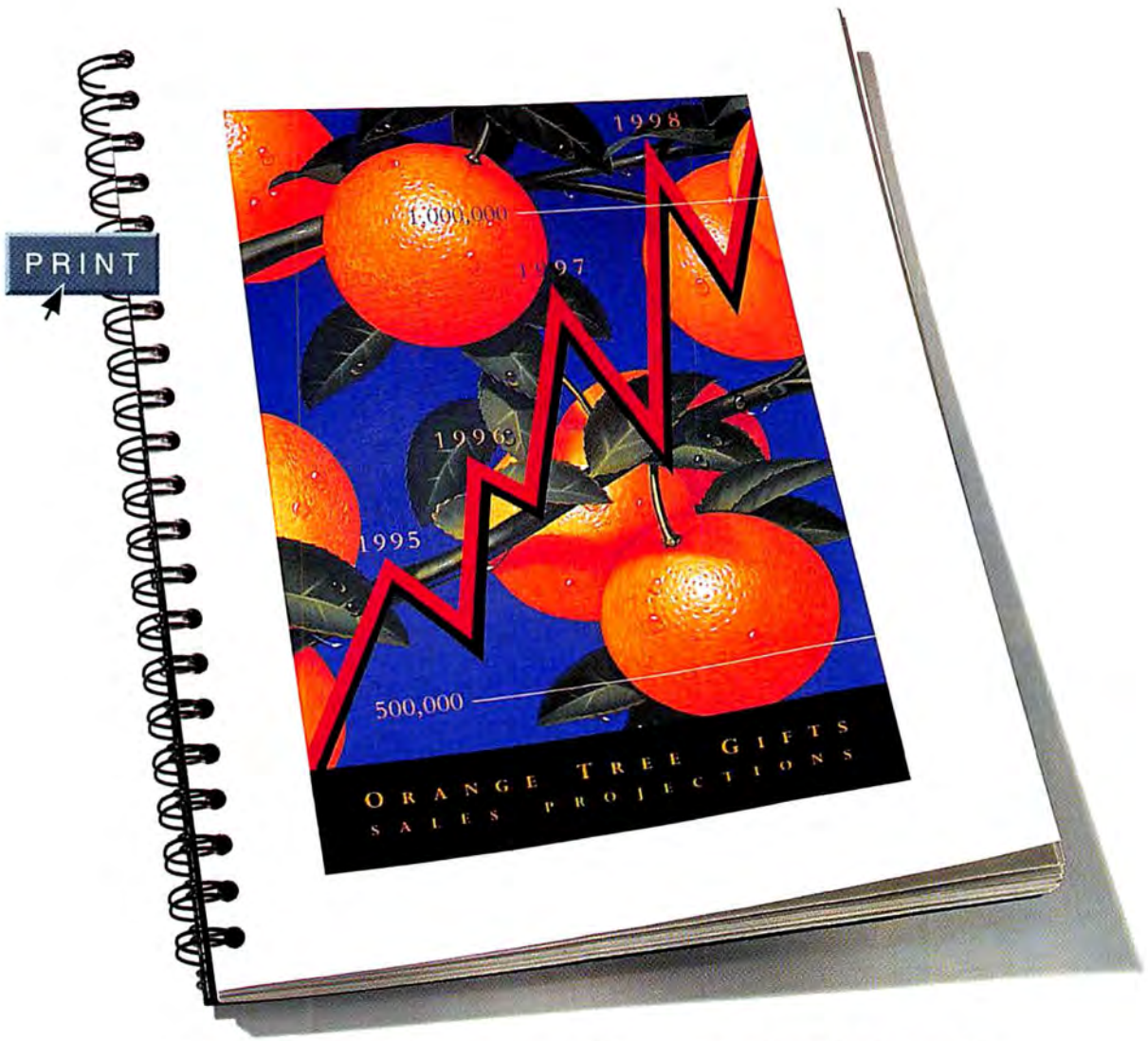
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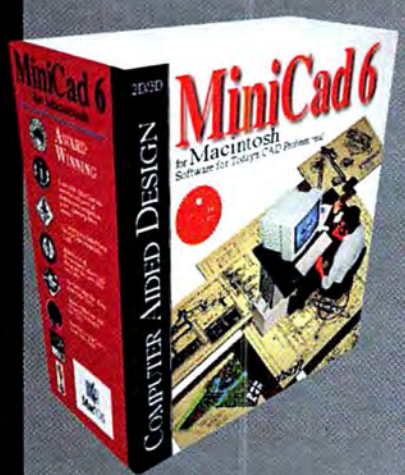
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by Adrian Mello

Announcing Macworld 12.X: More News, Know-How, and Buying Advice

FIND OUT WHAT THE LATEST UPGRADE HOLDS IN STORE

POP QUIZ: NAME THE only major Macintosh-related product introduced and available on the day the Mac itself launched that not only survives today but has become one of the most popular Mac products of all time. Time's up: the answer is *Macworld*. Like all good Mac products, we upgrade periodically to stay current with the marketplace. With this issue, we launch *Macworld* version 12.X.

Upgrading is a tightwire act: the trick is to introduce improvements without destabilizing users' comfort with the previous version. "Change is good and necessary," we told ourselves, while worrying in the very next breath, "People hate change." We saw no call for dramatic change, but in response to readers' requests, we undertook a number of substantial improvements. Here's a quick tour.

One of *Macworld's* key goals is to keep you abreast of today's developments in computing technology so you can prepare for tomorrow. We used to run news stories in various sections of the magazine; now you'll find all the news at the front of the magazine—your first stop for the latest on new products and emerging trends in technology. Not only is this arrangement more convenient for readers, but it also permits us to more than double the amount of news we bring you.

More Macworld Ratings

Readers rely on *Macworld's* product reviews to help them make difficult buying decisions. We've always covered more Mac products than any other publication, and our reviews are renowned for their accuracy and fairness. Now we're adding even more information to help guide you through the thicket of new Macintosh products by more than doubling the number of products rated in every issue, incorporating a consistent rating scheme throughout all reviews, product roundups, and *Buyers' Tools*. We're even showing ratings in the table of contents so you can take in an issue's worth of reviews at a glance.

The five-star rating system still provides a general measure of a product's worth, but we've added a numerical score for greater precision. We evaluate seven factors—feature set, design implementation, performance, reliability, ease of use, innovation, and value—to arrive at the rating. Five stars and a score from 9.0 to 10.0 means we think a product is outstanding; four stars and 7.0 to 8.9 points means it's very good; three stars and 5.0 to 6.9 means it's good; two stars and 3.0 to 4.9 indicates a flawed product; and one star and a score of 2.9 or lower denotes an unacceptable product.



Product comparison tables now call out ratings in bright red for every product in the article, as well as indicating those that receive the *Macworld* Editors' Choice award. You'll still find a summary of our conclusions in the Editors' Choice box, which singles out noteworthy products and shows the type of use for which they are best suited.

Honing Buyers' Tools

We've beefed up our *Buyers' Tools* section to make it more useful. It now opens each month with a comprehensive look at a single product area—two-page monitors, gigabyte hard drives, and so on—providing Macworld Lab results, key purchase criteria, ratings, and Editors' Choice designations. You'll get expert buying advice and see how each product stacks up against the rest.

Macworld was one of the first computer magazines to devote a column to consumer issues. Now check out our expanded *Consumer Advocate* department. Each month it focuses on a specific issue such as buying computers by mail order, finding a reputable repair service, tips for traveling with a Mac, and recycling your old Mac. A special section of consumer letters from our readers follows, along with Bugs and Turkeys, warning you about product bugs and design flaws; Streetwise Shopper, a selection of special bargains; and Service Heroes, where we take note of vendors offering exceptionally good service.

Finally, we've enhanced *Star Ratings*, the ultimate buyers' reference tool, by adding the issue date and page number of the original product review to make it easier to find. We've also incorporated Editors' Choice selections into *Star Ratings* so you can see how products fared in head-to-head comparisons.

Telling Secrets

This issue marks the debut of *Secrets*—the first of two major new sections in *Macworld* that take a solutions-oriented approach to computing, giving Macintosh users the technical know-how to get the most from their systems. Each month,

continues

contributing editor Joseph Schorr will show you little-known Macintosh tricks and techniques. Can't get enough of a good thing? *Macworld*'s longest-standing column, *Quick Tips*, from *Macworld*'s longest-standing contributing editor, Lon Poole, continues to provide workarounds, hints, and hidden features. Why mess with success?

Last in the *Secrets* section is *NetSmart*, a new column to help you master the expanding online universe. *NetSmart* tackles the issues Net surfers face, from the mysteries of bandwidth to managing multiple E-mail boxes. *NetSmart* also points you to noteworthy Web sites and downloadable shareware.

Converging Media

The convergence of digital media has truly come of age, a transformation *Macworld* heralds with its new *Media* section. The *Media* section begins with a column by the same name, from longtime contributing editor Jim Heid. His new column will explore a wide range of topics relating to sound, video, animation, and the many new options facing interactive-media authors.

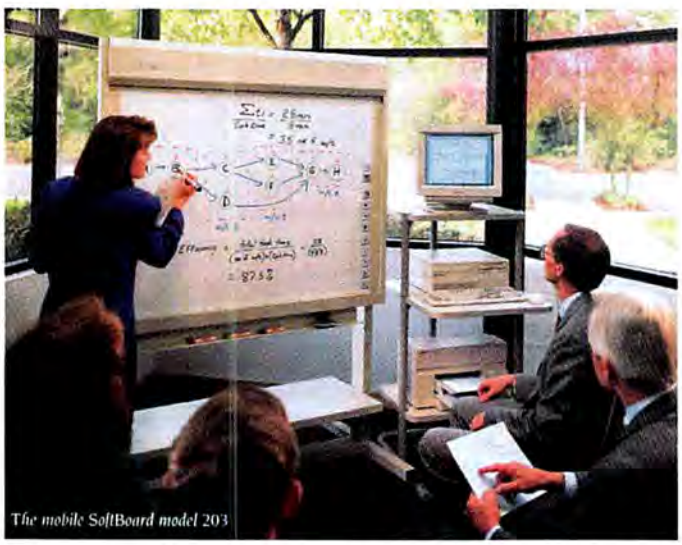
Next comes *Publishing Workshop*, a practical, nuts-and-bolts approach to enhancing your publishing techniques. And we mean both online and print publishing, in recognition of the expanding opportunities publishers are encountering on the Net. *Graphics Workshop*, the final piece of the *Media* section, was formerly known as *Expert Graphics*. We've revamped it a bit to offer a more hands-on approach, making it easier for you to apply the techniques you read about.

The Year of the Platform

The two new sections, *Secrets* and *Media*, both came about as a result of our efforts to view our readers' computing activity as a whole, not just as a bunch of individual programs and hardware components. More than other computer users, Macintosh users have a relationship with their computers that is greater than the sum of its parts. In keeping with this philosophy, with this issue *Macworld* also launches a yearlong project to explore Mac systems as overall solutions for key jobs.

We begin with three in-depth features. In "The Best Mac for the Job," Galen Gruman describes six types of computing work and picks the best Mac model, along with the best combination of peripherals, to accomplish the appointed task. The other two features probe the Mac's effectiveness in two of its traditional areas of strength—publishing and ease of use. How does the Mac hold up in these areas when pitted against Windows 95? (See "The Publishing Face-Off," by Steve Roth and Olav Martin Kvern, and "Is the Mac Still the Easiest to Use?" by Howard Baldwin.) Stay tuned. As the year unfolds we will help you discover the best combination of products and setups for a variety of purposes.

Well, there you have it—the latest version of *Macworld*. I think you'll find we've kept the best of the previous version and made some major improvements. Please write and let me know what you think. After all, it's never too early to begin thinking about our next major upgrade, and the first step is to listen to our customers. m



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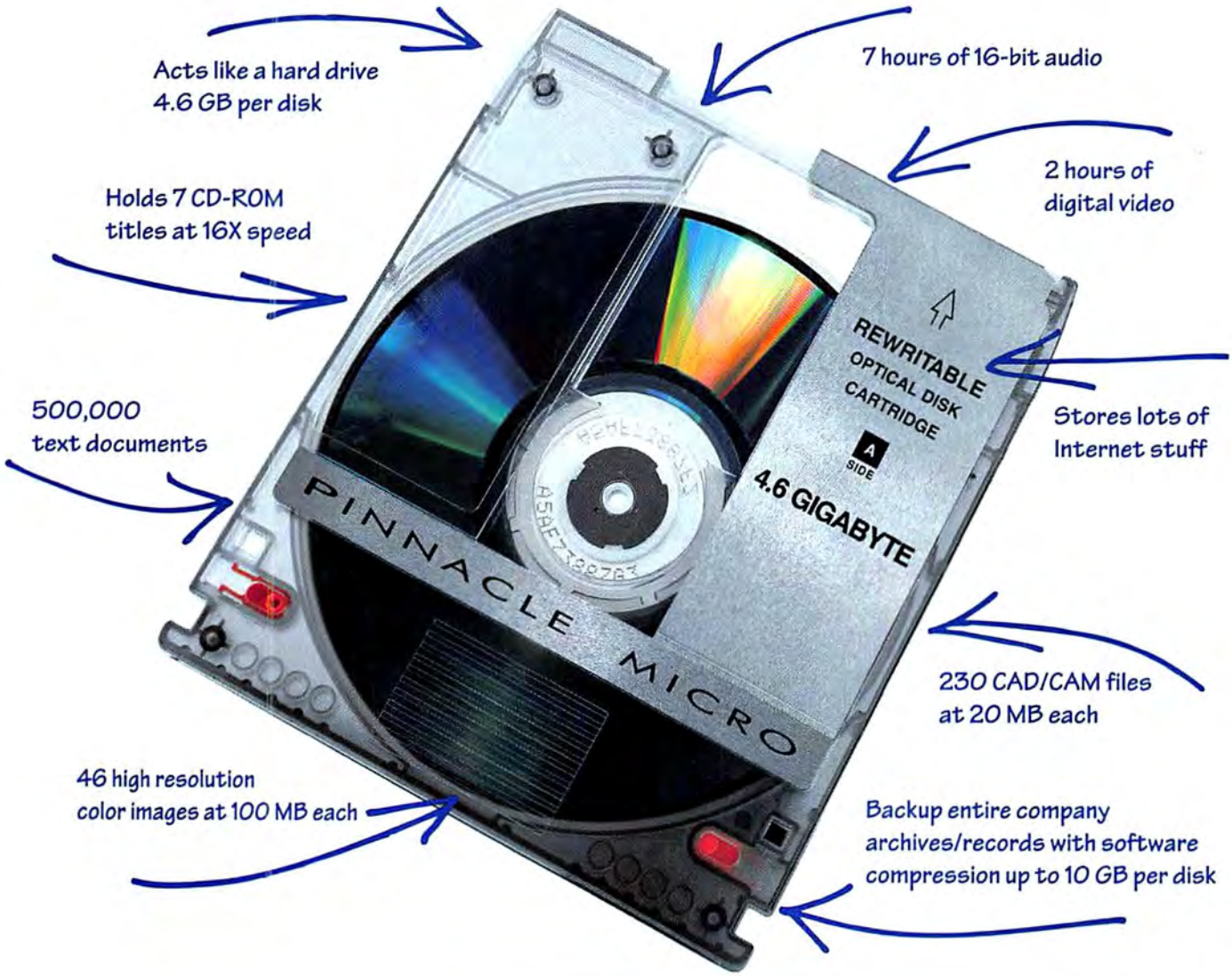
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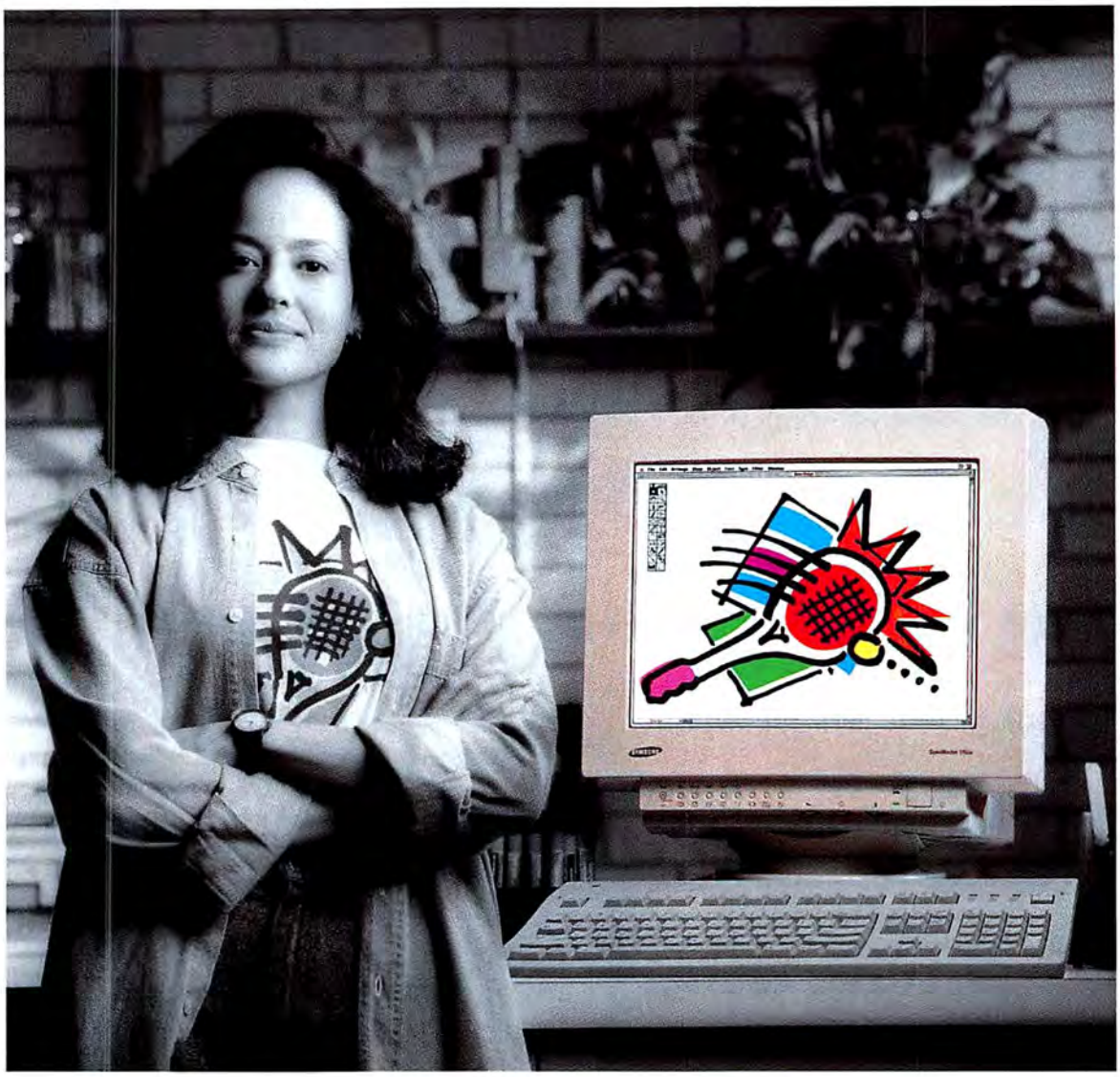
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The Desktop Critic

by David Pogue

What I Did on My Honeymoon

IN WHICH THE POWERBOOK CONQUERS FOREIGN PHONES . . . SORT OF

THERE WAS ONLY ONE problem with my plan to take an extended honeymoon overseas: I was supposed to write a book and several columns during that time. When my fiancée suggested I bring my PowerBook on the trip, I knew right away I was marrying the right woman.

We planned to visit Thailand and Indonesia—not exactly high-tech heaven. Would I be able to get power? Neither the wall plugs nor the voltage overseas match those of the United States. And how would I turn in my work? I normally transmit my stuff by E-mail. Could I get online in Asia's less developed countries?

Truth be told, though, I mused on these matters for mere moments. After all, isn't this the Mac? Isn't this the age of global telecommunications? For power, I'd get one of those solar-panel PowerBook chargers—Asia certainly has no shortage of sunlight. For E-mail, I'd use an online service. For electrical and telephone jacks, I figured Radio Shack would have whatever adapters I needed. With a smile of confidence, I called the travel agent about our honeymoon. "Book it," I said.

Gearing Up

But I should have kept worrying. America Online, for starters, is still only *America* Online; likewise, eWorld is really only eUSA. And while CompuServe claims to have phone access numbers in Thailand and Indonesia, I was warned that I wouldn't be able to use any of those easified front-end programs like CIM or Navigator. I'd have to get by with an all-text terminal program like Zterm.

The next step was buying the solar panels ($429; Keep It Simple Systems, 406/442-3434). Wouldn't you know it; they're available for every PowerBook model except mine—the Duo. Disappointed, I bought two spare batteries and hoped for the best.

Fortunately, a call to Apple revealed that a PowerBook automatically converts 220V overseas power to the 110V current it expects. Neat! I needed only an adapter for the Duo's power cord (to make it fit the two-round-prong Asian wall jacks). Radio Shack was happy to sell me one ($7.95 for four adapters, item number 273-1405).

Then I started to have nightmares of alien phone systems with weirdly shaped jacks. How would I connect my modem?

I went straight to the source: CompuServe's Pacific Rim forum (**go pacforum**), which was crawling with knowledgeable travelers. Unfortunately, they weren't



exactly bubbling with enthusiasm. "I don't mean to discourage you, but I bat about 50 percent overseas with my PowerBook," wrote one guy. "Overseas phone systems are often primitive and dirty," wrote another. "Getting married is easier than making a modem call overseas," wrote a third. "Have a nice honeymoon."

But there was no turning back. I asked for suggestions. Helpful Guy 1 said I should pack a screwdriver and some alligator clips. Once overseas, I was to dismantle the wall jack, connect the clips to the proper terminals, and run a cable to the laptop. Of course, if it turned out to be a digital line, I'd fry my modem.

Helpful Guy 2 proposed that I buy a WorldPak, a set of 37 adapters for every kind of phone jack in the world. Only $495 (Magellan's, 805/568-5400; also sold separately). But he, too, warned that a digital line would nuke my modem. Great.

Helpful Guy 3 proposed an acoustic coupler, the modern-day descendant of those big old boxes into which you'd place your telephone handset. The modems' squeals are transmitted audibly through the earpiece and mouthpiece. An acoustic coupler, this guy said, would eliminate all the hassle of adapters and wall plates. In a pinch, it would even work on a pay phone.

I called TeleAdapt (408/370-5105), a company that does nothing all day but solve modem-connecting problems like mine. The phone rep assured me that the coupler would work; I ordered one ($150).

The TeleAdapt guy also said some Asian hotels actually have USA-type phone jacks, which would be easier to use than the coupler. To avoid the smoked-modem problem, he suggested a Modem Saver, a plastic thermometer-like gadget (TeleAdapt, $30). You insert it into the mystery phone jack, and three little lights indicate the jack's danger potential.

I bought one, got married, and left for the honeymoon.

One Night in Bangkok

After a 14-hour flight, we stayed overnight in Bangkok—lo and behold, the one city in Thailand where CompuServe has a phone number. First, power: with fevered anticipation, I attached the Radio

continues

Shack adapter to my Duo's power cord. When I plugged it into a hotel-room outlet, a bright blue spark popped out of the socket, scaring me to death. Nonetheless, the Duo now had juice.

Now I tried my Modem Saver. I snapped it into the hotel's U.S.-style phone jack; two of its little bulbs lit up. My Modem Saver manual said that these indicators meant, "Polarity reversed—proceed with caution." Handling the PowerBook as cautiously as possible, I gulped and proceeded.

The Mac dialed beautifully. I had to type a bunch of ridiculous code to connect, and top speed was 2400 bps, but I didn't care; I was online. I read my E-mail from halfway around the planet.

Screen Tests

The next day, our backpacky tour group boarded a minivan—the first ride of many that were ideal for getting work done. But after an hour of typing, I stopped and stared at the screen. There, slashing across the entire display, was a one-pixel-high, horizontal white line. No amount of fiddling with the screen controls got rid of it. As I watched, two more lines of my screen blinked white, too.

Maybe it was the heat and humidity; maybe the Mac was homesick. But by the end of the day, there were *seven* thin white lines striping my screen. I had to make sure that my typing fell between the problem areas—and hope that the screen wouldn't go completely blank before I could finish my chapters.

Moreover, after two weeks of sleeping in bamboo bungalows, I hadn't once encountered an electrical outlet. When all three batteries ran out of juice, the Duo went dark. I carried the crippled machine in my luggage for five days—dead weight.

Hello, Bali

Indonesia is actually 17,000 islands scattered across 3000 miles of ocean. Our first stop, the breathtaking island of Bali, had electricity—battery juice!—but CompuServe's sole access number was on Java, a long-distance call away. This was serious; my deadlines were fast approaching, and my screen was fast disappearing.

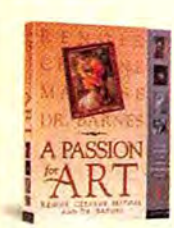
Few Indonesians have telephones. Instead, everybody goes to local Telkom centers—24-hour convenience stores with only pay phones and fax machines. I marched over there, ready to transmit. I figured that my compressed file would take only a few minutes to send.

These phones were hardwired to the wall—I could forget about a direct connection to the Duo. It was now time to whip out my acoustic coupler. What a weird-looking gadget: it resembles a phone receiver with black rubber suction cups instead of ear- and mouthpieces. As directed, I squished these cups against the receiver. I wrapped the Velcro strip tightly around the two instruments, holding them together as though they were mating. I ran the curly cable to the Duo. The whole assembly dangled from the phone, looking very low-tech and silly. The other customers stared at me as though I'd grown antlers. I smiled and dialed.

It didn't work. For some reason, the pay phone couldn't hear the dialing tones made by the coupler. I tried 15 times. I even tried dialing the phone with my finger, then slapping the receiver to the coupler just as CompuServe's modem started to squeal—still, no success. Shrugging sheepishly, I finally packed up and bid my little audience adieu.

continues

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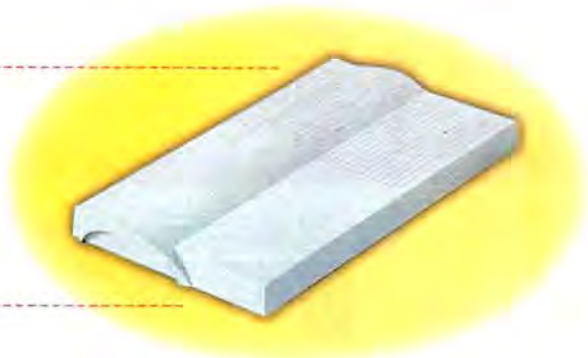
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Hot Java

To avoid the inflated hotel-phone prices in Bali, I didn't try again until we journeyed to Java, the island with CompuServe's access number. My manuscripts were finished, and the deadline was upon me. I thought I'd make a fast, cheap modem call from the hotel's front-desk phone and finish my project.

No such luck. The call was still long-distance, and the hotel charge was $3 per minute. Then inspiration struck; I remembered that our tour guide, Emil, had a house on Java. Could I use his phone for a few minutes and pay him back at regular rates? He agreed.

Maybe I should have taken the raging thunderstorm as an omen. Nonetheless, I hooked up to Emil's telephone and dialed Java—and got a busy signal. He explained that Indonesia has a limited number of long-distance lines. At 9 p.m., which it now was, the rates drop, and everybody piles into the Telkom centers, jamming the lines.

After 18 attempts, I connected to CompuServe. The system asked for my ID number—and stopped. It wouldn't ask for my password! It took 20 more sign-on attempts before I saw the blessed word on the screen—*Password:*—and I was in. I started the file transfer to my editor.

But because the phone lines were so busy and so staticky, the file took forever to transmit. Zterm's little progress window said, "Efficiency: 4%." *Four* percent? That explained Zterm's other disheartening little comment: "Time remaining: 175 minutes."

For the next three hours, I sat there and stared miserably at the progress bar inching its way across the screen. Shortly after midnight, the screen said, "93% complete." And then it said, "Time remaining: 13 minutes." And then it said, "NO CARRIER."

I gaped in horror. Some pop of static had disconnected me; the entire call had been wasted. It was all I could do not to hurl the Duo into the nearby jungle.

I *had* to turn in this file tonight, no matter what the cost. I stormed back to the hotel. Lightning flashed. I hooked up the acoustic coupler to the front-desk phone. Five times I tried to connect, unsuccessfully, as the late-night desk clerks joked and pointed.

Then I remembered: this was an *acoustic* coupler. Hadn't the manual said that sounds in the room could actually introduce errors into the signal? I asked the desk clerks for momentary silence—and got into CompuServe.

I started the file transfer. On the small patch of my screen that wasn't dead, I read, to my amazement, "Efficiency: 48%." I had never considered that, so late at night, the phone lines would be so much clearer, and my data would travel so much faster. In less than 14 minutes, the file transfer was complete.

The Upshot

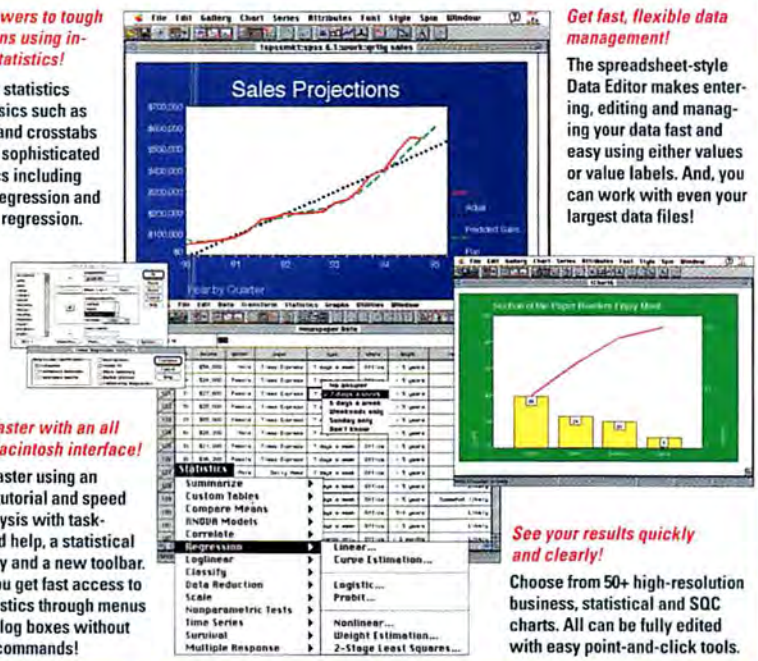
I learned a few things on my honeymoon. Next time I dial up an online service in the USA, I'll marvel at its speed and reliability. Next time I hear the term *global village*, I'll giggle. And next time I go on a honeymoon, I'll go to Niagara Falls. ■

Contributing editor DAVID POGUE coauthored *Macworld Mac & Power Mac Secrets*, third edition (IDG Books Worldwide, 1996), in part, on his honeymoon. His Duo's screen inexplicably recovered after the trip; today, only three white lines remain.

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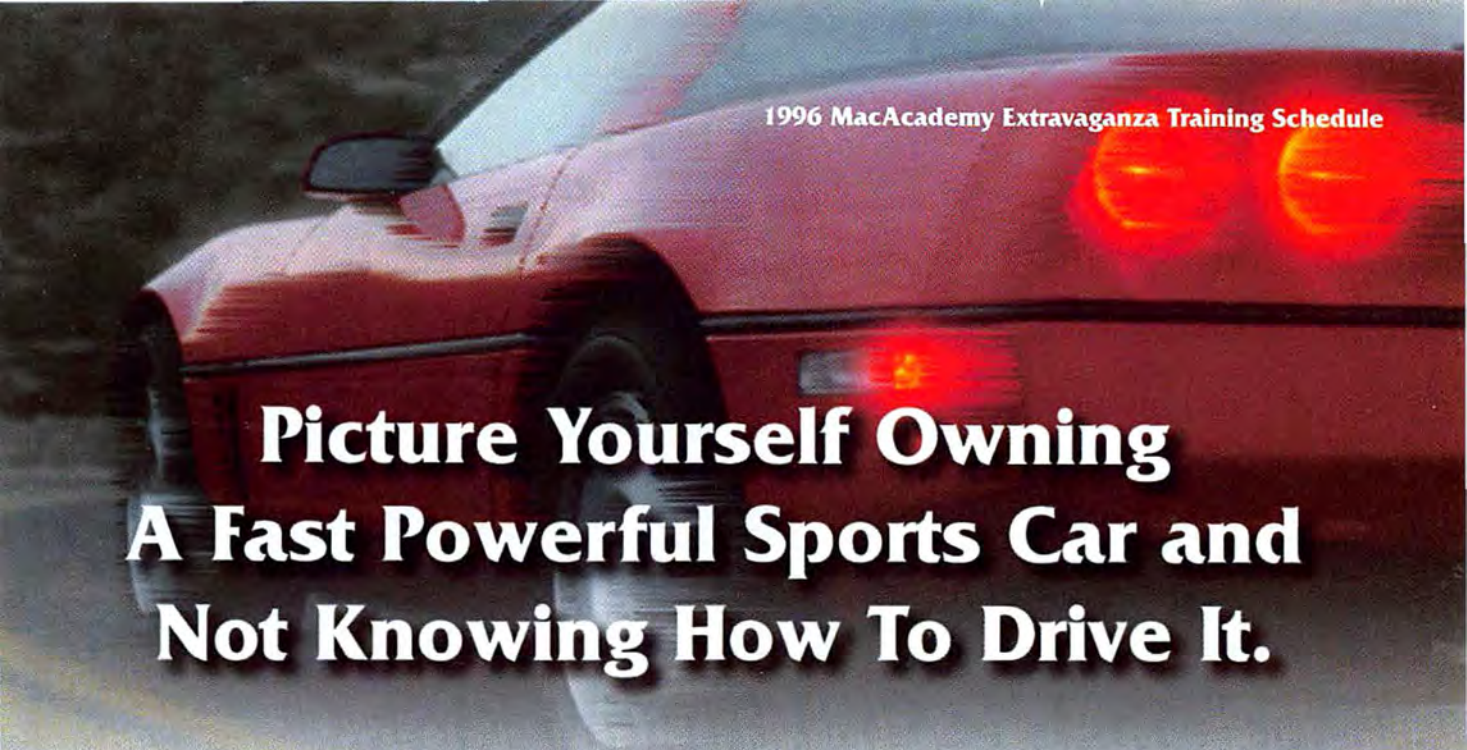
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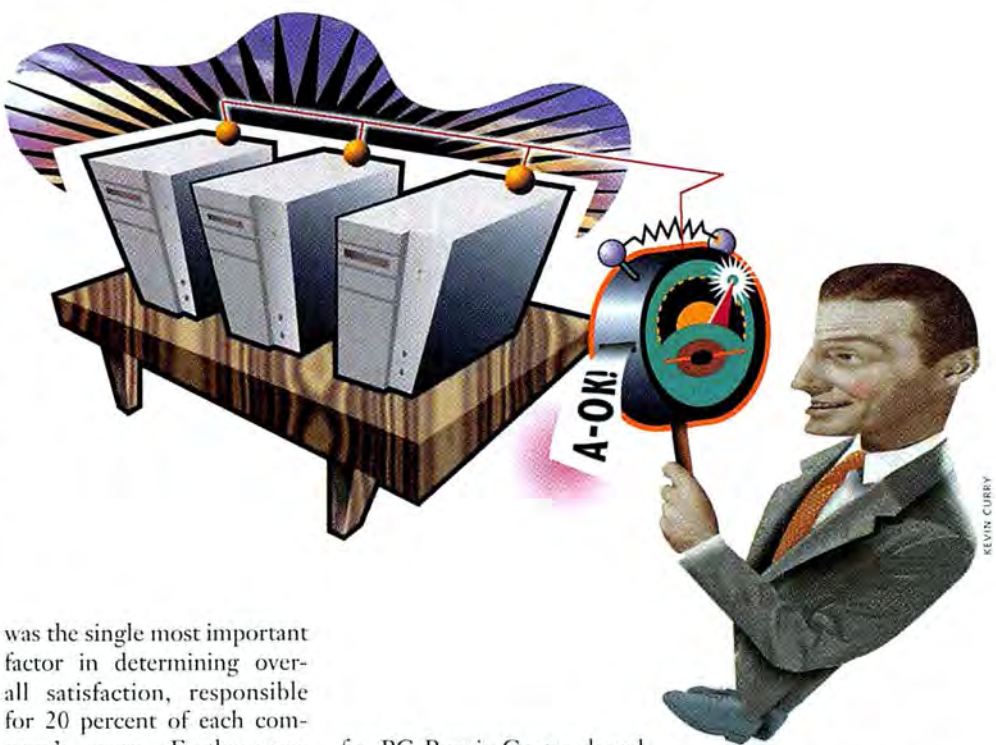
News

industry

Macintosh Is Still Quality King

DESPITE FALL INCIDENTS, APPLE BEATS PC MAKERS

by Elinor Mills



The high-tech buzz this past fall made it sound as if the Macintosh was the official computer of the Unabomber: guaranteed either to explode or to stop working. But despite a few isolated problems (however spectacular) with exploding batteries and defective CPUs, the talk is just that—talk. The Macintosh remains the cream of the crop when it comes to quality.

In fact, Apple and Hewlett-Packard lead the industry in overall customer satisfaction, according to the "1995 Desktop Personal Computer End-User Satisfaction Study" conducted by the market research firm J. D. Power & Associates. Apple and HP tied for first, beating out PC giants like Dell, Compaq, IBM, Digital Equipment Corporation (DEC), and Gateway 2000.

These results are especially significant because reliability (trouble-free operation, ruggedness, frequency of repair, and condition on receipt) was the single most important factor in determining overall satisfaction, responsible for 20 percent of each company's score. Furthermore, when J. D. Power asked Apple users specifically about repair problems, Apple scored as well as, or better than, the industry average.

Technicians in the field confirm the J. D. Power results. "[Apple's] quality, to us as a service company, has held strong," says Vincent Collins, a field manager who works on both PCs and Macs for PC Repair Center, based in Fremont, California. "They've come out with some problems, but they've quickly gotten rid of them."

Industry analysts agree. "My impression of Apple is that they are probably much better at their quality control and have much lower DOA [dead-on-arrival] machines and returns than other manufacturers," says Pieter Hartsook, editor of *The Hartsook Letter*, a Macintosh research newsletter. Hartsook singles out Packard Bell, a popular PC maker not included in the survey, as a company that was plagued last year with DOA PCs. "The return rates for that kind of problem were between 10 and 20 percent," he says. "Apple's is down below 1 percent." (Packard

Bell did not respond to calls seeking comment; Apple and other PC companies refused to disclose figures on returns, defects, and repairs; and some retailers and distributors refused to comment.)

Why the Black Eye for Apple? More than anything else, Apple's recent hardware troubles—overheating lithium-ion (LiIon) batteries in the new PowerBooks, and, in some Performas, PowerPC 603 CPUs that made calculation errors—appear to be a remarkable string of extremely well-publicized instances of bad luck. According to industry experts, such problems can happen to any company, particularly when it gets components from outside suppliers.

For example, the two exploding LiIon batteries that forced a recall of the PowerBook 5300 series were made by Sony Electronics, which has several years' experience with such batteries (see "Apple Recalls PowerBook 5300 Series," *News*, December 1995). Sony and Apple executives are still baffled by the battery problem. "We have never had a problem like this before with any of our other laptop customers," including Compaq and Dell, says Sony spokesman Manny Vara. Most of Sony's products are composed entirely of Sony-made components, "so we have maybe a little more control over the quality."

Meanwhile, the defective PowerPC 603 CPUs found in about 500 Performa 5200 and 6200 computers were from Motorola, which makes all the 603's and some of the 604's used in various Power Mac models (IBM makes the 601 as well as the 604). "That's unusual for Motorola, which employs a six-signal process for guaranteeing quality," says G. Dan Hutcheson, president of VLSI

continues on page 42

graphics

Designing for the Web

A REPORT FROM THE TRENCHES: WHAT TECHNIQUES WORK

by Cathy Abes

With the World Wide Web becoming a mainstream phenomenon, graphic artists and designers have been venturing into this new medium in greater numbers—creating Web pages and sites for themselves and for commercial clients. What does it take to become a successful Web designer? Must you learn a whole new way of working, or can you leverage your existing skills? Is learning HTML, the language of the Web, essential for today's and tomorrow's designers? Or will the new generation of authoring tools soon make HTML obsolete? It depends on what you want to do—and who you ask.

Like many Web designers, Eric Baker of Eric Baker Design starts his images in a draw program (he uses Adobe Illustrator) and brings them into Adobe Photoshop, where he designs the page, making each image file as small as possible by switching to Indexed Color mode, which greatly reduces the number of colors in his palette. Currently redesigning the Electronic Newsstand's site (**http://www.eNews.com**) and creating a site for *The Sawtooth Wolf Family*, a book by photographer Bill Dutcher, Baker envisions many traditional print jobs turning into Web projects.



SmallWorld Media Group's Web site features easy-to-navigate pages and colorful, high-contrast images that require no scrolling and can be viewed on small monitors.

InfraRed Communications' Sasha Magee helped design Macromedia's Web site (**http://www.macromedia.com**) using Macromedia's new ShockWave technology, which let him create small, fast-loading animations that he could integrate directly into the page. He creates Web graphics primarily with Macromedia FreeHand and Photoshop, using Equilibrium Technologies' DeBabelizer to reduce colors and file sizes and to convert documents to GIFs, one of the Web's graphics formats.



Although Magee thinks the next generation of Web design and authoring tools may be powerful enough for basic tasks, like defining levels of headings and wrapping text around images, he's not so sure about complex jobs, like laying out tables and splitting pages into different windows (frames). Like most Web designers *Macworld* spoke with, he found HTML useful and easy to learn, especially since learning is interactive; as you change existing code, you see the effect right away.

Dennis Orlando's Web-design firm, SmallWorld Media Group (**http://www.180079world.com**), put its site online in November. Orlando brings his FreeHand files (ones originally done for print output as well as new Web-specific images) into Photoshop for resizing, scaling, type manipulation, and online preparation. A veteran Fractal Design Painter user, Orlando is impressed with Painter 4's ability to automate the HTML tagging process. Not only does the new version let you create image maps from floating selections, but it gives you the flexibility to change your mind. Previously, if you changed an image's clickable areas you had to re-create its image maps, but Painter 4 automatically redefines the map as you make changes.

The two most important considerations for Web design, says Orlando, are speed and color. Images should be small and simple, so they'll draw quickly and you won't have to scroll to see them. He saves images as 24-bit JPEG files so they're viewable at lower bit depths (most Internet users' monitors display only 256 colors)—even in 24 bit, the images draw quickly. And since most Web images are viewed only on screen, their resolution shouldn't be higher than 72 to 75 pixels per inch. If he expects an

continues

IN THE NEWS

Live Audio on the Web 41

ColorSync Comes of Age 45

Digital Video Goes PCI 46

The PowerBook Plague 47

Copland Sees the Light 48

image to be downloaded, Orlando links a high-res version to the low-res one. Of the Web's two common graphics formats, JPEG and GIF, Orlando prefers JPEG because of its higher compression, better image quality, and smaller file sizes.

Ron Meckler of Re: Design, who designed Pantone's Web site (**http://www.pantone.com**) as well as the literary and film areas of the Delphi site (**http://www.delphi.com**), uses Illustrator, QuarkXPress, and Photoshop to create his Web pages. He also uses a plug-in called GIF89a Export, which exports Photoshop files in interlaced GIF format.

Virginia Tech professor Andrew Cohill runs Blacksburg Electronic Village (**http://www.bev.net/**), which has provided Internet access to the town of Blacksburg for the past two years. Like Orlando, he expects to rely heavily on Painter 4's Web-design capabilities.

Multimedia developer and Web designer Andrew Soderberg of Toucan Studios (**http://www.toucanstudios.com**), who was an Adobe PageMill beta tester, doesn't think learning HTML is essential. PageMill lets him lay out objects and pages much faster than typing HTML code, and he finds it powerful enough to handle about 80 percent of the work involved in a project. In fact, Soderberg thinks Adobe Acrobat's versatile PDF format may soon become the standard layout language of the Web. If and when that happens, learning HTML will no longer be an issue.

networking

The Windows 95 Waiting Game

MAC CONNECTIVITY OPTIONS ONLY NOW ARRIVING

by Galen Gruman



Certainly no one who uses a computer didn't know about Windows 95 long before it shipped. But you'd think it was a secret, based on the lack of connectivity options to connect Macs and Windows 95–based PCs, three months after Windows 95 shipped and more than two years after it was announced.

For many people, the lack of connectivity options is more than an inconvenience. Several PC-to-Mac connectivity options that worked under Windows 3.1 do not function under Windows 95. Unfortunately, you shouldn't expect a lot of options to be in place anytime soon. Here's the status of the major options.

Disk Exchange Windows 95 saves both its new long file names (250 characters maximum) and an old-style DOS name (8 characters, followed by a period and a 3-character code indicating the file type), so any PC disk–mounting software for the Mac, such as Apple's PC Exchange software, can read Windows 95 files—but you lose the long file names.

To read Windows 95 files on the Mac, most people turn to PC Exchange 2.0, which comes with System 7.5. But that version supports only DOS names. Apple (408/996-1010) would not estimate when it will support Windows 95's long file names.

But you don't need to wait for Apple. Software Architects (206/487-0122, **sales@softarch.com**) has a solution now. Its DOS Mounter 95 handles the new long file names. The $100 program also lets you create dual partitions (one Mac and one Windows) on a floppy, removable cartridge or disk, or hard drive. Upgrades cost $30, while PC Exchange owners can get DOS Mounter 95 for $50.

For reading Mac disks on a PC, you have a few choices.

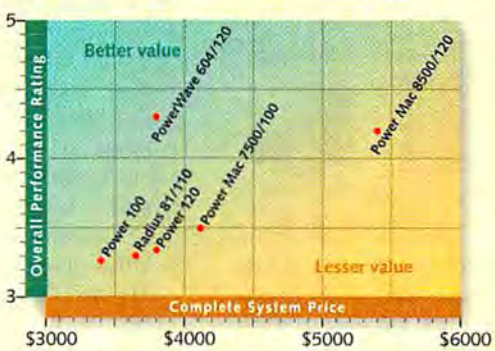
Are Clones Really Cheaper?



KEVIN CANDLAND

PowerWave 604/120

The initial promise of Mac clones was a lower price for the same great Apple technology. With two clone makers (Power Computing and Radius) now shipping systems in volume, has the promise been met? In a nutshell, yes. *Macworld* compared the street prices of complete Mac systems (including 16MB of RAM, a 15-inch color monitor, an extended keyboard, a 1GB hard drive, and a 256K cache card) and found that Power Computing and Radius both offer cheaper prices than Apple—significantly cheaper, in fact. Power Computing charges about 15 percent less than Apple for a 100MHz PowerPC 601–based system (the Power 100 versus the Power Mac 7500/100) and about 25 percent less for a 120MHz 604-based system (the PowerWave 604/120 versus the Power Mac 8500/120). Apple does offer extra video-input/output technologies in its 8500, which accounts for some of the extra cost. Radius's 81/110 is about 10 percent cheaper than a Power Mac 7500/100, and a tad faster (110MHz versus 100MHz, although this slight speedup is not noticeable in most tasks). —GALEN GRUMAN



Overall performance ratings are times as fast as a Centris 650.

• DataViz (203/268-0030) offers the $75 MacOpener 1.0, which lets a Windows 95 PC read Mac floppy disks, removable cartridges (including SyQuest, Bernoulli, Zip, and magneto-optical), CDs, and hard drives. But not easily: you can't open files in the Explorer, File Manager, or programs; you have to use the MacOpener program to copy Mac files to your PC media. DataViz is also working on Conversions Plus 3.5, a $149 Windows 95–compatible file-conversion program; upgrades will cost $40, and MacOpener is also included. On the Mac side, you'll need version 8.06 of the $109 MacLinkPlus file-conversion program to handle the new Windows 95 file names. Upgrades cost $40 from version 7.0 and $20 from version 8.0.



DOS Mounter 95 lets your Mac read and write Windows 95 files.

• By the time you read this, Software Architects plans to ship a Windows 95 version of Here & Now, a $90 program that lets PCs read and write Mac disks.

• Insignia Solutions (415/335-7100) only recently began the engineering work to make its $59 MacDisk product work with Windows 95. The product lets a PC see a Mac disk from any Windows or DOS program. But under Windows 95, MacDisk 1.0 disables the PC's floppy drive completely, and Insignia says only that a Windows 95–compatible version will ship sometime before July.

• Paul E. Thomson's TransMac $64 shareware utility can copy files to and from a Mac floppy or CD in a PC's drive, but it does not recognize Windows 95 long file names (it uses the old-style names instead) and it's awkward to use.

Networking In an office, disk exchange is usually less of an issue, thanks to E-mail and direct file exchange over the network, but full interoperability is still a ways off.

• Miramar Systems (805/966-2432, **sales@miramarsys.com**) has updated its $199-per-client MacLAN Personal Connect software, which adds the AppleTalk protocol to PCs so they can network to any Mac. Version 5.5 runs under Windows 95 (previous versions did not), but the program cannot recognize long file names; it instead substitutes old-style DOS names. Miramar expects to ship a version that handles long names by April. Upgrades from 5.0 to 5.5 cost $59 until December 31, 1995, and $99 thereafter.

• Farallon Computing (510/814-5100, **info@farallon.com**) is now shipping Windows 95–compatible versions of its Timbuktu Pro for Networks file-sharing programs: version 1.1 for Windows and version 2.0 for Macintosh. But the Windows version is merely compatible with Windows 95: it does not support long file names. Nor does it work with Macs on an AppleTalk network, even if you use Personal MacLAN Connect version 5.5 or later on your Windows 95 PC. (You'll need a TCP/IP or NetWare IPX network for cross-platform exchange.) Farallon says the next Windows version will support long file names and AppleTalk, but the company has no estimate for a ship date. Prices range from $42 to $70 per user, depending on how many licenses you buy.

Internet WATCH

BY CAMERON CROTTY

The Better to Hear You

With RealAudio 1.0, that little RCA dog might have had trouble recognizing "his master's voice." The software lets you play audio files over the Internet as you download them, but the quality leaves something to be desired. Version 2.0 of Progressive Networks' Real Audio (206/447-0567, **info@prognet.com**) is optimized for delivering music over the net. A 28.8-Kbps direct connection is required, but the sound quality is significantly improved. With version 2.0, content producers can also embed instructions in audio clips, telling a user's browser to download an image or jump to a given URL. A beta client should be available by the time you read this; check it out at **http://www.realaudio.com**. The final version is expected to ship in January.



Net Result: Macintosh

Put up the 1995 banner—Netcom (408/556-3048, **info@netcom.com**) is finally shipping a Mac version of its NetCruiser Internet-connection software. NetCruiser for Mac 1.0 includes all the things an integrated package should: Web browsing, gopher, FTP, E-mail, Telnet, Usenet news, and IRC, all tied together with a Finder-like file of favorite places that Netcom calls the Notebook. Installing NetCruiser and connecting to Netcom is a one-click affair; the company has even built its own system-level connection driver (no MacPPP necessary). NetCruiser 1.0 for the Mac is expected to ship in January, and you'll be able to download the software from **http://www.netcom.com**.



Image Is Everything

Joining a growing trend of providing convenient one-stop shopping on the World Wide Web, West Stock and PhotoDisc have each introduced Web sites where you can search image libraries, then license and download royalty-free images—all in a single session. West Stock's Muse (**http://www.weststock.com**) and PhotoDisc's On-line (**http://www.photodisc.com**) both set up and approve users' credit card accounts online; PhotoDisc also sets up corporate and individual accounts online or through a toll-free number. Muse photos range in price from $8 to $70, while PhotoDisc's prices range from $10 to $100.



PETER HOEY

"MAC IS STILL KING"
continued from page 39

Research, a component maker (the six-signal industry standard denotes very rigorous quality assurance). "Probably more than any other U.S. company, Motorola has really pushed the quality issue at ICs [integrated circuits] so [a problem] doesn't filter up to the system level, which is more expensive to fix."

Apple has repeatedly been praised for its handling of the LiIon battery problem, which posed a safety risk. The company wasted no time in getting word out about the situation, including publishing a letter on its World Wide Web site, and it replaced all the PowerBooks that contained the faulty batteries. Compare that with Intel's see-no-evil approach to the Pentium flaw a year ago. However, with the faulty PowerPC CPUs, Apple hasn't been as aggressive. "It's difficult for us to find where the end user is all the time," says Neal Woods, Apple's director of engineering for worldwide operations. "So we rely on our warranty process."

In general, Apple's support receives mixed reviews from those who must deal with the company on a regular basis; some ranked it among the best computer companies and others complained that Apple is slow to respond to service calls. *Macworld*'s previous findings on Apple's support have been a mixed bag. In the past two years, Apple has won and tied for first place in the Best Customer Support/Hardware category of *Macworld*'s World-Class Awards. At the same time, the company has received stinging rebukes for technical-support shortcomings from *Macworld* readers, writers, and editors alike.

Why then is Apple being publicly hammered for freakish hardware problems that may not even be its fault? Apple's biggest problem right now is that it's perceived as a company that keeps dropping the ball when there's little time left on the clock and the home team is way behind on the scoreboard. Whether such criticism is warranted, "Apple has to execute flawlessly," says Chris Goodhue, an analyst at the Gartner Group research firm.

Cost-Cutting Hurts Quality

The strong criticism from users and analysts about computer flaws may be justified in general, even if not in Apple's case. "There's been a tendency in the PC industry to allow the quality to really fall off," VLSI's Hutcheson says. "It's an accepted fact that the customer is the guinea pig and the one doing the testing, and not the vendor, and that's one reason why PCs are so inexpensive." Hutcheson further notes that most customers aren't willing to pay the extra money it would take manufacturers to test every component—particularly add-on cards, which could add $50 to $100 to the price of a computer. Customers prefer to assume the statistically low risk of having to return a computer, Hutcheson says.

Responsibility for testing system components lies with both the component suppliers and the computer vendor, although the vendor typically suffers most of the blame, as its name is on the finished product. "Over the years, Apple has done an excellent job with testing hardware before it goes out," says Peter

continues on page 46

Making Small Compromises

APPLE ADOPTS COST-CUTTING MOVES

In a world where price is increasingly a selling point for computer buyers, Apple is being forced to look for ways to cut costs so it can remain competitive. That means making small compromises on external features such as casing material and control-panel doors, industry observers say—compromises that PC vendors have always made, but that are new to the Mac market.

For example, Apple replaced an automatic floppy-insert mechanism with a manual mechanism on all new Macs, and is using trackpads instead of trackballs on its notebooks because they cost less to make and service, says Tom Santos, president of Macadam, a Macintosh dealer in San Francisco. Similarly, Apple went back to using plastic enclosures in its hard drives instead of the more costly metal ones. Users accepted the changes fairly quickly. But Apple got burned trying an unpopular lighter-weight mouse from Malaysia that felt cheaply made—users complained and Apple went back to a better mouse.

Kader Guettatfi, owner of The Computer Company in San Francisco, criticizes Apple for switching from SCSI drives to cheaper IDE drives and says he has been replacing Macintosh motherboards in customers' new machines because of CPU failure "for no apparent reason." For him, "that's proof that Apple is lowering the quality in order to be competitive." *Macworld* has noted that the PCI Power Macs have flimsier cases with plastic struts and flaps that easily break off. Even an Apple service technician admits he's broken several such parts despite his training and experience.

An Apple spokesperson responds that Apple is not aware of any widespread problems with motherboards and that using industry-standard IDE drives brings "additional price performance to customers."

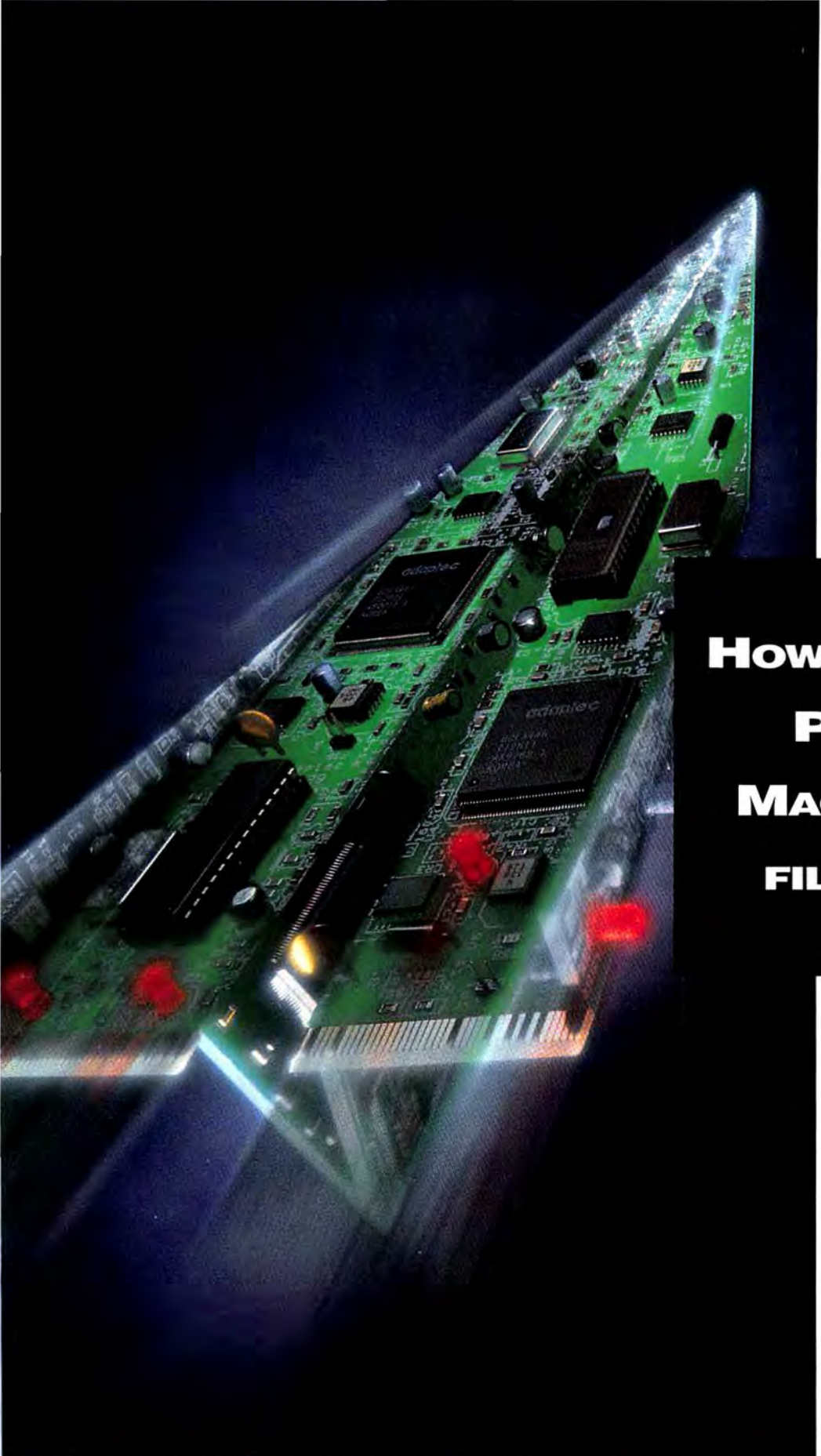
Neal Woods, Apple's director of engineering for worldwide operations, says that improving the Macintosh technology and moving toward industry standards, not cutting corners, is how the company plans to sell more computers. "We absolutely do not believe that lowering the quality is the way to get market share," he says. "We believe that the Apple brand is considered a high-quality product, and that's a good selling point for us."



KEVIN CANDLAND

A SONY BATTERY HURT APPLE'S IMAGE.

—ELINOR MILLS





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Circle 26 on reader service card

graphics

ColorSync Goes Mainstream

CONSISTENT COLOR ON THE DESKTOP

by Cathy Abes

Now that major vendors are introducing products that support Apple's ColorSync 2.0 color-matching system—including add-ons for Adobe Photoshop and QuarkXPress—color management is finally on its way to becoming an integral part of artists' and designers' desktop toolboxes.

With the Helios ColorSync 2 XTension, jointly developed by Helios (408/461-6061, **info@ugraf.com**) and Linotype-Hell (516/434-2000, **info@linotype.com**), users can color-match TIFF images, as well as elements like boxes, borders, and text, within QuarkXPress. The $495 ColorSync 2 automatically separates and color-matches RGB images during output, and the XTension lets you work in device-independent CIELAB color space or convert Pantone colors to CIELAB.

Helios's ColorSync-compatible OPI software, EtherShare OPI 2.0, due in early 1996, will let Mac owners offload files created with the Helios XTension to a Helios OPI server and maintain consistent color throughout the prepress process.

With Apple's ColorSync 2.0 Plug-ins for Photoshop, users of any application that supports Photoshop plug-ins will be able to acquire an image from one device and export it to another while maintaining accurate color. Compatible with Photoshop 2.5.1 and later versions, the plug-ins are available free via online services, including AppleLink, eWorld, and Apple's Web site (**http://www.austin.apple.com/macos**).

The latest version of Light Source's Colortron Color Control System (415/925-4200, **LightSource@applelink.apple.com**) supports ColorSync 2.0 as well. Its Colortron II hardware combines the capabilities of a spectrophotometer, colorimeter, densitometer, and monitor calibrator, while the ColorShop 2.0 software determines the best



four-color process screen using either ColorSync 2.0 printer profiles or Photoshop separation tables. You can choose colors from the Pantone Digital Color Libraries as well as create custom color libraries. By April, Linotype-Hell plans to bundle its Print-Open ICC software, which builds ICC profiles for output devices, with the Colortron system.

Other recent ColorSync-savvy products include Scitex's (617/275-5150) Create-LUT application for creating and editing color-transformation tables; Logo's (**logo.ger@applelink.apple.com**) Profile-Maker Pro, an ICC profile generator for output devices; and Canon's (714/437-7210, **jrichard@canon.com**) ColorGear color-management system.

PETER HURLEY

Sneak PEEK

CyberFinder: Internet Nerve Center

BY CAMERON CROTTY

If your Internet bookmark list is longer than both your arms and more disorganized than Fibber McGee's closet, Aladdin Systems (408/761-6200, **info@aladdinsys.com**) has just the utility for you: it's called CyberFinder, and I had the opportunity to preview a prerelease version.

CyberFinder is a control panel that turns your Finder into an Internet nerve center. The software coordinates all your Net-access utilities, adds hot keys so you can quickly and easily handle the URLs you find in your Web travels, and lets you collect bookmarks in special files called libraries.

CyberFinder libraries hold bookmarks in all shapes and sizes—anything that can be listed as a URL is fair game. When you double-click on a library icon from the Finder, a window opens, just as if the library were an ordinary folder or file volume. Once placed in a library, bookmarks become draggable icons you can organize in folders, and sort by name, kind, URL, and creation order. You can also manually edit the URL of any bookmark. Although CyberFinder stores bookmarks in its Get Info box, these are not stored as Get Info Comments and so will survive the desktop being rebuilt.

Double-clicking on a bookmark launches the required application, which you identify within the CyberFinder control panel. CyberFinder relies on Peter Lewis's freeware Internet Config extension (which CyberFinder installs) to map bookmarks to their helper applications. For an application to work with CyberFinder, the app must support the GURL Apple event—Aladdin has a list of which helper applications will work and which won't, and most popular Mac Net applications are supported.

CyberFinder also has hot keys that make it easier to deal with URLs in your daily, non-Internet existence. Selecting a URL in a text document and triggering the Grab hot key creates a new bookmark for that URL in your favorite library. Triggering the Launch hot key with a URL selected launches the appropriate application and takes you to that address.

CyberFinder's greatest strength—and its greatest weakness—is that it relies on other applications to actually navigate the Net. Switching back and forth between even the smallest apps is like ballet-dancing with hippopotamuses. Nevertheless, CyberFinder serves as a handy Internet utility and an enticing taste of the promise of component software. CyberFinder is currently available for $30; a demo version may be downloaded from **ftp://ftp.amug.org/pub/contrib/aladdin/**.



No matter where you are on your Mac, you're only a hot key away from the Net with CyberFinder.

"MAC IS STILL KING"

continued from page 42

Linde, one of the directors of the Berkeley, California, Macintosh user group BMUG and president of a consulting firm.

"On the purchased parts, we will either [conduct tests] or the supplier will do it to our specification," Apple's Woods says; outside companies that are assembling whole systems also test every computer using the same rigorous process Apple uses. That rigor probably explains why Apple has higher quality than low-priced PC makers like Packard Bell.

Apple's iron control over the Mac platform also gives the company a longer-term—and occasionally more intangible—quality advantage, according to VLSI's Hutcheson. "Not just quality in terms of whether the box fails. It's quality in terms of making sure every part plays together," he says. "You can buy a PC and spend a week or two putting it together." Macintoshes usually work right out of the box.

PC Repair Center's Collins agrees: "You get people selling reconditioned units and used and seconds as new, and when you don't have the control that [Apple] has—which is one vendor with control over the product—you get degradation." Defects in motherboards or their components are among the most common problems, according to John Mork, multimedia product manager for Computown, a San Francisco–based dealer. Apple makes its own motherboards, and it has a small number of companies supplying its key motherboard components.

Buying certain components, such as batteries and CPUs, from specialized companies is common for computer makers, according to Apple's Woods. He says that Apple also outsources some of its manufacturing, but only contracts out work—such as assembly of the CPU, motherboard, and hard drive inside the box—when orders exceed its manufacturing plant's capacity.

While cost reduction is not the main reason for outsourcing, manufacture contracting allows companies to meet growing demand without increasing capital investment, he says.

Special REPORT

Digital Video Gets PCI Religion

BY JIM FEELEY

Nothing, but nothing, chews up bandwidth and CPU cycles like digital-video editing, and digital-video pros look forward to hardware advances with the kind of rabid, foaming anticipation generally only exhibited by televangelists waiting for the phones to light up.

The new PCI Power Macs represented one of those hard ware advances, but the pros still needed add-on editing and effects cards that would work with these high-performance Macs. Six months after the Power Mac 9500—the first PCI Power Mac—shipped, digital-video professionals can finally start taking advantage of the speedy Power Mac 8500 and 9500, as Data Translation, Truevision, and Radius ship their PCI digital-video cards. High-end users will also be able to capture digital—not just analog—audio and video source material. But those waiting for bargain-basement Mac PCI digital-video cards must wait some more.

On the software side, developers are planning early 1996 releases of platform-independent digital-video software tools.

PCI Cards for Video Pros

Here's what hardware digital-video professionals can expect to choose from.

- Data Translation (508/460-1600) will release the QuickTime-compatible Media 100qx in January for less than $5000. The card has the same hardware as the company's popular Media 100 system, but it ships with Adobe Premiere 4.2 rather than the Media 100's editing environment. The 100qx card supports composite and Y/C video with up to eight channels of 16-bit audio.
- Truevision's Targa 2000 PCI card (408/562-4200, info@truevision.com) costs $5795 with support for composite and Y/C signals. A $7995 Pro version adds support for component video. Both cards offer improved cabling and two channels of 16-bit audio. Targa plans to offer daughtercards supporting MPEG encoding, digital I/O, and other options.
- Radius (408/541-6100, support@radius.com) expects to ship a PCI version of VideoVision Studio by February.



SUZANNE ROADY

Data Translation's Media 100 is one of the first PCI cards.

Little Low-End in Sight

Radius technical-support staffer Kennedy Brandt also said that Radius, the only company to sell a NuBus DAV (Digital AudioVideo) board, will "never" produce a low-cost digital-video card like the SpigotPower AV for the Power Mac 7500 and 8500's DAV slot. (The DAV slot in the Power Mac 7100AV and 8100AV is incompatible with that in the Power Mac 7500 and 8500.)

Macworld has been able to uncover only one low-cost PCI digital-video capture card for the Mac: the miroMotion DC20, a $1200 card due by April from miro Computer Products (415/855-0940).

Speed Not a Given

While PCI promises to deliver throughput good enough for uncompressed video, not all cards are up to speed yet. For example, in mid-October Truevision said its Targa 2000 PCI card typically captures at 4.5 MBps, while the NuBus version captures at 8 MBps—

EXCLUSIVE

More PowerBook 5300 Woes

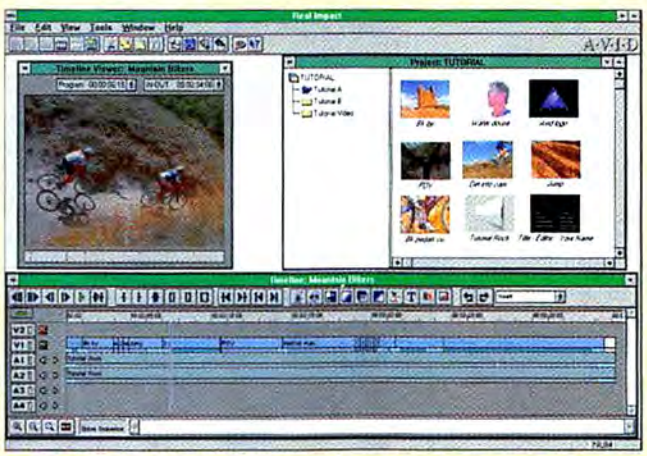
BATTERY, POWER, AND CIRCUITRY FLAWS

by Cary Lu

More than any previous PowerBooks, Apple's most recent high-end model has been plagued with a host of troubles. First, Apple replaced the lithium-ion (LiIon) batteries it had begun to ship with 5300-series PowerBooks (see *News*, December 1995) because two of the Sony-made batteries had caught fire. Now, ironically, Sony's LiIon battery–producing plant in Koriyama, Japan, has itself been destroyed by fire. The Koriyama facility produced 3 million LiIon batteries a month (about three-quarters of the world's supply), and Sony's second LiIon plant, in Tochigi, Japan, won't be operational until the spring. Thus, even if Sony figures out what went wrong with the LiIon batteries, no new ones will be available until at least mid-year. So Apple will have no choice but to continue shipping 5300-series PowerBooks with nickel–metal-hydride (NIMH) batteries, which it began doing when it resumed PowerBook shipments.

Circuitry Woes The replacement batteries work fine, but many of the PowerBooks don't. A half-dozen design and manufacturing flaws have emerged, including some power and circuitry problems. For example, the power supply does not produce enough current to run many combinations of expansion-bay and PC Card accessories at the same time; the control circuitry for reducing power consumption when the PowerBook is in Sleep mode, itself goes to sleep before completing its job. As a result, a fully charged PowerBook can sleep for only four days instead of the usual eight to ten days. Another, less serious flaw: the computer may lock up after you press the reset button and the power-on key;

continues



Avid will port Real Impact from Windows NT to the Macintosh by mid-1996.

although PCI is a much faster bus. (The PCI card does provide superior playback rates, according to the company.) The slower-than-expected performance seems to be related to the software driver. Truevision expects to improve PCI capture rates soon.

A FireWire Boost?

While users and vendors get used to PCI, some are already expecting FireWire—a new type of SCSI—to provide the next major improvement in Mac video editing. Sony's recent introduction of a $4000 VX-1000 digital camcorder (201/930-1000, **contact@sel.sony.com**)sparked renewed interest in FireWire.

Developers say the combination of moderately priced digital-videotape formats that compress images during capture, and fast digital I/O, will yield higher-quality images and faster transfer rates. You could transfer 30 minutes of video from your FireWire camcorder to your Mac in under 10 minutes, according to several developers.

Both Data Translation and Truevision say they are seriously considering adding FireWire and other digital I/O connections such as S/PDIF audio to their products by midyear. Jonathan Zar, senior business-development manager at Apple, says that several developers will release PCI FireWire cards in 1996 and that Apple plans to build FireWire support into Mac motherboards by 1997.

Software Prayers to Be Answered

While professional-level digital-video hardware is expected this winter, the outlook for software is longer-term. Adobe recently released After Effects 3.0 and Premiere 4.2, but the rest of the digital-video software picture is still coming into focus.

- While many editing packages remain tied to a particular vendor's hardware, it appears that will soon change. At deadline, Radius Edit was available only to owners of VideoVision Studio and Telecast. But Radius representatives say Radius Edit will soon be available for use with any QuickTime system. And in January, Radius plans to release Soft Studio, a software codec that will render VideoVision Studio and Telecast files without Radius digital-video cards.
- Avid (508/640-6789) will upgrade Avid VideoShop to support both SMPTE time code and edit decision lists (EDLs). Avid also plans a midyear release of Real Impact for Macintosh, a $2995 editing package.

Finally, as Macintosh video systems mature, developers are preparing plug-ins to smooth production and polish presentations. In early 1996, Waves (615/588-9307, **sales@waves.com**) expects to move its line of well-regarded audio plug-ins (see "The Mac Recording Studio," December 1995) to the Premiere plug-in format used by a growing number of digital-video and -audio programs. And MetaTools (805/566-6200, **metasales@aol.com**) has acquired the well-regarded After Effects plug-in package Final Effects—now sold as the $695 KPT Final Effects 3.

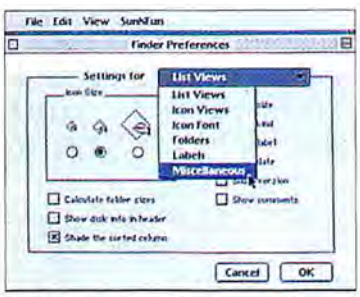
Systems WATCH

BY CAMERON CROTTY AND GALEN GRUMAN

Copland Beta Released

Apple has distributed early prototype versions of the next-generation Mac Operating System, best known by its code name, Copland, to several dozen key developers so they can begin developing software for the forthcoming System 8. *Macworld* has obtained an early copy, as shown in the accompanying screen image.

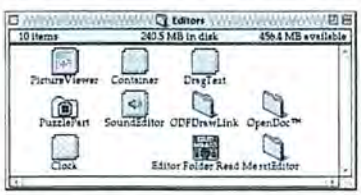
The release is welcome news, since Copland has been delayed from mid-1996 to early 1997. Copland was first shown in spring 1995 under tight Apple control (see "The New Mac OS Unveiled," *Macworld,* July 1995), and developers were supposed to get their first prototypes in September. The actual prototype release occurred in November. Apple's chief of development, David Nagel, recently told the Reuters news service that "our internal schedule still calls for late '96 or very early '97—like really a couple weeks into 1997." However, Nagel said at the Macworld Expo in August that Copland at that time was just two days late from the then-planned June 1996 release date. In the meantime, if you just gotta have the spiffy Copland interface, download the $10 Aaron utility from Macworld Online—the extension provides much of Copland's look and feel now (we used it in the OpenDoc screen image below).



An early version of the Copland OS.

OpenDoc Soon to Ship

Apple has also released a developers' kit for OpenDoc, its technology for letting miniprograms, called components, work together and with the Mac OS, similar to how plug-ins work in Adobe Photoshop and QuarkXPress. When an OpenDoc document is open, OpenDoc will load the correct component into RAM as needed and unload it when done, based on what type of object is selected. OpenDoc 1.0 for users should be released by March as an extension to System 7.5. It will be an integral part of Copland.



OpenDoc programs, such as those here, load automatically as needed.

Clone Momentum

The Taiwanese PC-motherboard manufacturer Umax has obtained a license to the Mac OS. Umax's license initially restricts it to Simplified Chinese and International English languages, and Umax will focus its sales efforts on Taiwan and China, where Apple has done poorly. Under the license, Umax will later be able to sell Mac clones anywhere in the world.

Umax's first systems will be released by April and will likely be relabeled Power Computing NuBus and PCI systems, but the company plans to introduce new systems in mid-1996 based on the PowerPC Platform, the joint IBM/Apple/Motorola system formerly known as CHRP. The three partners announced in mid-November that the PowerPC Platform specification is now finalized, after a year's effort. Apple has said that it plans to port System 7.5 to the PowerPC Platform by summer 1996.

Open Transport Patch

The fifth patch to Apple's Open Transport networking architecture, which ships with System 7.5.2, is now available. You can download version 1.08 from **http://www.support.apple.com**.

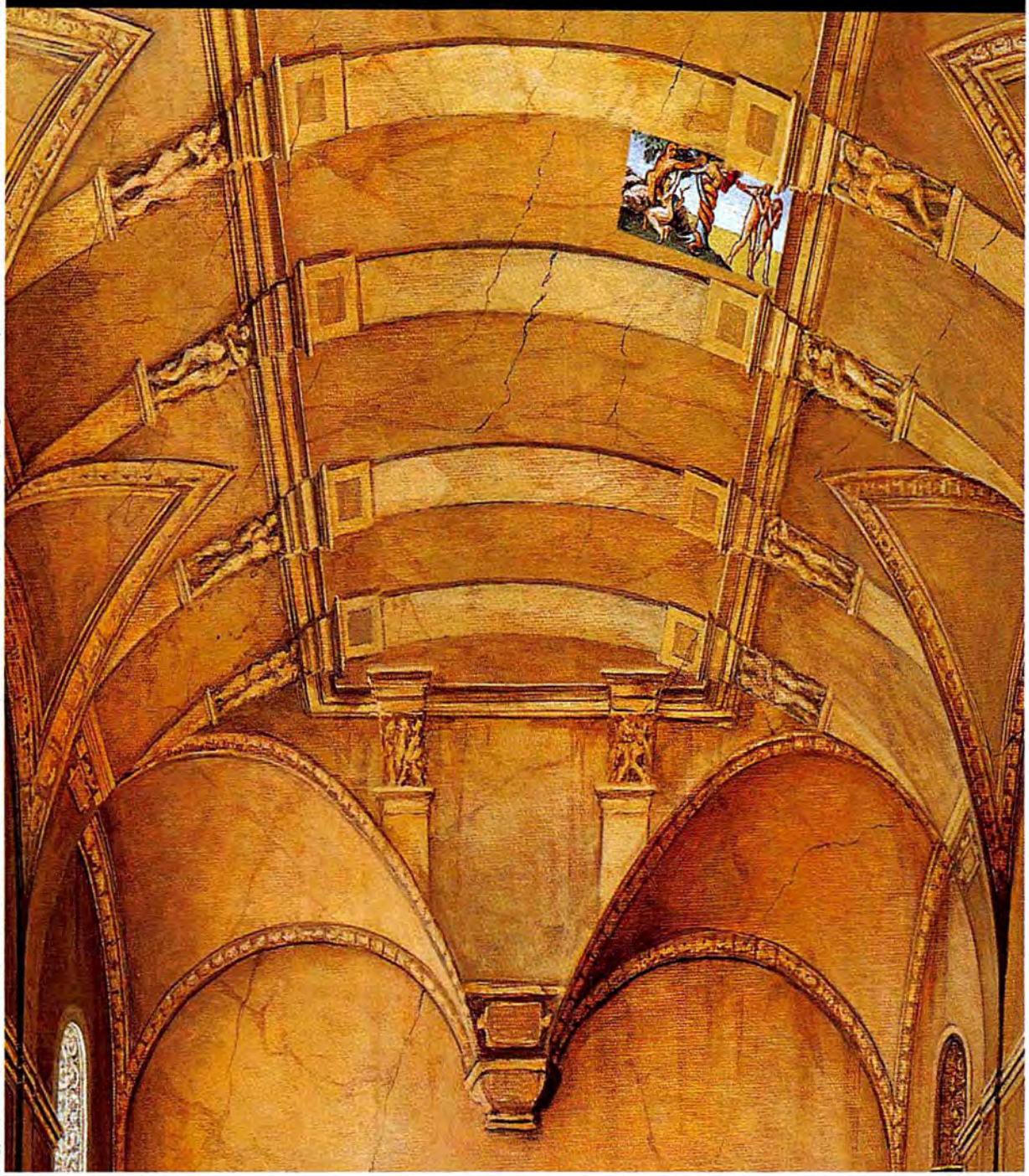
you can fix it by pressing reset and power-on again. Not everyone will experience all these annoyances, but for those with severe problems, Apple will provide a replacement motherboard that fixes the flaws. Apple has been making changes in the production line, so there is no easy way to determine what problems a specific unit might have without testing.

All current third-party fax programs are incompatible with the 5300; only Apple's Telecom version 2.3 works, and only if you fiddle with the installation. Apple failed to include PC Card support in the U.S. version of Apple Telecom, so you need to download two disk images from Apple's online software-distribution sites (the main one is **http://www.apple.com**): Apple Telecom 2.3 disk 2 of 2 and Apple Telecom/PC Card Modem 2.3 (which is disk 1 of 2, although not labeled that way). Don't use Apple Telecom 2.3 disk 1 of 2, which installs GeoPort software (which won't work on a 5300).

New PowerBooks to Debut

But even with all these quirks, the 5300-series PowerBooks are still expected to sell a million and a half units, three times as many as the 500-series models. According to unofficial sources, two more 5300 models will appear this year to keep the momentum going—one with a faster CPU and probably a separate cache (memory storing recent CPU instructions that works faster than standard RAM), and the other with a deeper palm rest to accommodate a CD-ROM drive in a larger expansion bay (which will also accept standard expansion-bay accessories). And finally, expect to see a lower-cost PowerBook series, code-named Epic, which will differ from the 5300-series by using, for example, a differently shaped battery.

What if Michelangelo had been confined to an 8½ by 11 inch space?





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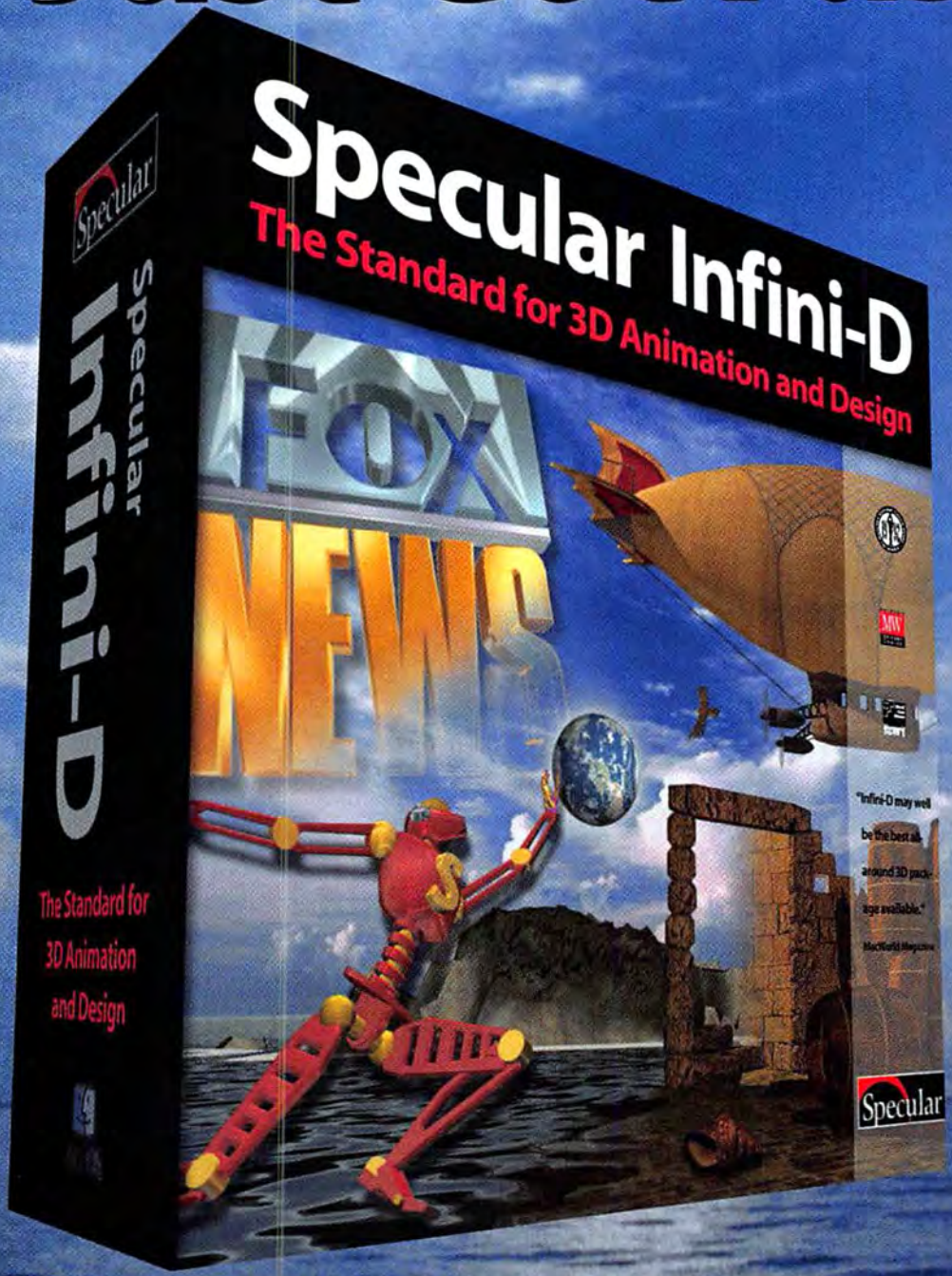
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Circle 41 on reader service card

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New Products

THE LATEST MACINTOSH RELEASES

BUSINESS

Project Estimator

Looking to get more business? Videofonics (919/821-5614, **vfdavid@aol.com**) thinks it has the tool you need: the $70 MacEstimate 2.0, which helps you create project bids.

Nonprofit Manager

Diakonia's Faithful Steward 1.6 ($149; 909/861-8787, **73160.471@compuserve.com**) helps nonprofit organizations get a handle on all the tasks they need to do on a shoestring, such as mailing, membership management, and donation tracking.

Business Management

If you have fewer than 100 employees and need to manage sales, marketing, inventory, and finance, check out Automatic Software's (415/919-0200) Big Business client/server version, $1999 for ten users.

DISPLAY

Touch-Screen Display

Clean those dirty fingers! MicroTouch Systems (508/659-9000, **touch@mts.mhs.compuserve.com**) has released the TruePoint SpaceSaver LCD flat-panel touch-sensitive monitor. The passive matrix version costs $2325, and the active matrix version is $3495. You can also use an optional $95 pen with the panel. A Mac-to-VGA connector is required.

Color Monitors

Several companies have introduced new color monitors in sizes ranging from 15 to 21 inches.

- LG Electronics (201/816-2000), formerly known as GoldStar, has the $550 Model 1535, a 15-inch display with audio-input and -output jacks and built-in stereo speakers.
- Sony Electronics (800/352-7669) offers the $499 Multiscan 15sx 15-inch monitor, the $649 Multiscan 15sfII 15-inch monitor, the $1099 Multiscan 17sfII 17-inch monitor, the $1399 Multiscan 17seII 17-inch monitor, and the $2299 Multiscan 20sfII 20-inch monitor. All but the 15sx come with a Mac adapter in the box; 15sx buyers can order a free adapter from Sony.



Sony Multiscan 20sfII

- Panasonic Communications & Systems (201/348-7000) has the C-1792P 17-inch monitor, with an estimated street price of $1099, and the C-2192P 21-inch monitor, with an estimated price of $1999.

GRAPHICS

Texture Generation

Rough it up or smooth it out with version 2.0 of TextureScape, the $199 texture-generation software from Specular International (413/253-3100). New features include spline drawing tools, randomization controls, and click-and-drag shape positioning. There's also an integrated browser with a thumbnail preview.

Image Morphing

The Valis Group's MetaFlo' 2.0 and MovieFlo' 2.0 (415/435-5404) animation tools both include the company's new Universal Reshape Tool, which lets you trace any part of an image and map or morph it into a new shape. Other new features include a layers palette, unlimited undos, and outline masks. MetaFlo' costs $599, while MovieFlo' costs $899.

Clip Art and Images

Looking for artwork to integrate into your own? Among the royalty-free art available are these new offerings.

- Classic PIO Partners (818/564-8106) has released the Classic Entertainment Collection (Volume I/Behind the Scenes), a $70 CD-ROM that features objects from behind the scenes of movies, TV, and stage.
- TDC Interactive (818/501-0700) offers ImageKit, a $1295, ten-CD collection of images designed for use in advertising and presentations.

INPUT DEVICES

Document Input

Visioneer (415/812-6400) has updated its highly rated PaperPort scanner and electronic-document software. The $369 PaperPort Vx adds a cropping tool for text, automatic OCR on copied text, and manual reorientation of images created by the scanner. Visioneer has also added full System 7.5 drag-and-drop support; sharper display on screen and in faxes; and new software for business-card scanning, copy management, and OCR.

Programmable Trackball

Kensington's (415/572-2700) latest trackball, the Turbo Mouse 5.0, offers four buttons that can each be programmed to perform common tasks. The Turbo Mouse also comes with Kensington's sophisticated control software. Kensington estimates the street price to be $110.



Kensington Turbo Mouse 5.0

MULTIMEDIA

CD Recorder

Looking to create your own CDs for archiving or multimedia mastering? Direct Connections (612/937-6283) offers the $1299 Recorder/Player double-speed CD recorder that also doubles as a quad-speed CD player.

Picture Book Manager

Gnügen's Mediagnügen 1.0.1 ($30; 303/776-7990) lets you archive, review, sort, and present as many as 13,000 multimedia elements in a picture-book arrangement, with 20 thumbnails per page.

MIDI Sequencer

Audiophiles using Deck II multitrack digital audio software will want to take a look at Metro 3, a $275 MIDI sequencer from OSC (415/252-0460). Metro 3 includes groove quantization, a new drum-grid display, and an improved tracks window. A bundle with Deck II costs $549.

NETWORKING

Integrated Remote Access

Want to save a step when accessing your network via Timbuktu's remote-control software over Apple Remote Access? The new Timbuktu Pro 2.0 for Networks, from Farallon Computing (510/815-5100; **info@farallon.com**), integrates ARA into the product. It also adds support for Novell's NetWare, in addition to the previous AppleTalk and TCP/IP protocols. Farallon estimates street prices from $42 to $70 per user, depending on how many user licenses you buy.

Mainframe Connectivity

Looking to access IBM AS/400 or 3270 systems? Take a look at the Mac Rumba line of software from Wall Data (206/814-9255). A graphical interface hides much of the IBM systems' command-line interface, and the software allows access to multiple IBM systems with a common interface. A Mac Rumba license for the AS/400 costs $345; the Mac

continues

New Products

continued

gateway client costs $125, while the TCP/IP and AppleTalk clients cost $225 each. The prices for Mac Rumba for Mainframe are identical.

Ethernet Hubs

Focus Enhancements (617/938-8088) has introduced the $440 EtherLAN Hub 16 V, a vertically mounted, stand-alone 16-port repeater hub for 10BaseT networks. One BNC connector lets you connect up to 30 devices via coaxial cable and T-connectors.

If your network is smaller, you might consider Microplex's (604/444-4232, **info@microplex.com**) $895, eight-port hub that also doubles as a multiprotocol print server and triples as a remote-access hub through its SLIP, PPP (with a free firmware upgrade), and IP Routing support. The M208 has eight 10BaseT connectors; an AUI port; one parallel port; and two serial ports. It provides simultaneous support for TCP/IP, IPX/SPX, AppleTalk, and NetBIOS over TCP/IP.



Microplex M208

PUBLISHING

QuarkXPress Plug-ins

The onslaught of additional capabilities for QuarkXPress continues. Among the recent new offerings are

- Vision's Edge (904/386-4573, **veiproduct@aol.com**) is offering Xdream, a $149 collection of 27 utilities for QuarkXPress. Functions include automatic opening of fonts as needed, alphabetization of selected paragraphs, a palette for inserting obscure characters, user-defined screen angles, user-defined grids, rotation and skewing of text within a text box, and searching and replacing colors in a document.
- Meadow Information Systems (708/882-8202, **meadows@ais.net**) has released AutoPrice, a $495 XTension that links QuarkXPress documents to external databases and eases price updating in catalogs.
- A Lowly Apprentice Production (619/438-5790, **support@alap.com**) has introduced two volumes in its XPert Tools collections of XTensions. Each volume costs $129 and offers more than a dozen tools.

Prepress Tools

Yet another job didn't output the way you expected. So let ScenicSoft's $199 Prepare (206/355-6655) help you out. The software lets you make and test complete electronic print jobs by combining and ordering files and pages from a range of programs; you can check out the entire job, correct page alignment, and collect and compress all files needed for output at the service bureau.

Newspaper Management

Whether you're in the age of X-acto or the age of Atex, you're in the electronic Stone Age. Baseview Products (313/662-5800) has several products meant to bring desktop publishing to your newspaper. ClassManagerPro lets you manage classified and multicolumn ads, while NewsEditPro lets you handle the editing, layout, and copyfitting of news stories. ClassManagerPro starts at $1595, while NewsEditPro starts at $395.

Service-Bureau Scanner

Move over, Ahhnuld, RoboTop is here. Linotype-Hell's (516/434-2000) Topaz Robot flatbed/transparency scanner provides color-corrected, unattended scanning of up to 150 originals per session. Nicknamed RoboTop by the company, the scanner costs $79,000; Robot upgrade kits for the Topaz scanner are available for $33,000.

Film Recorder

Polaroid Electronic Imaging Systems (800/816-2611, ext. 972) has introduced the ProPalette 8000 color film recorder. The $13,995 device offers scanning resolution of 8192 horizontal and 5462 vertical lines per inch.

SCIENCE/ENGINEERING

PowerBook Instrumentation

Now that PowerBooks are powerful enough for serious scientific work, National Instruments (512/794-0100, **info@natinst.com**) has released scientific instrumentation tools that fit in the PC Card slots of the new PowerBook 5300 and 190 series. National Instruments has seven cards, ranging from the $195 DAQCard-DIO-24 to the $695 DAQCard-1200.

TITLES

Safer Computing

Looking for a quick guide to avoiding injury when using your Mac? Peachpit Press (510/548-4393) offers *25 Steps to Safe Computing*, which has no-nonsense advice in a tips-oriented approach. The 72-page guide costs $5.95.

Myst for Readers

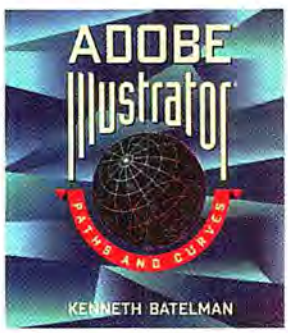
You've played the game, now read the book. Rand and Robyn Miller's *Myst: The Book of Atrus*, written with David Wingrove, is the first in a trilogy by the game's two creators that focuses on the rebuilding of a civilization by the last descendants of the D'ni culture. The $22.95 book, a prequel to the game, is available from Hyperion (212/633-4400).

Space Missions Relived

You've seen the movie, now play the CD. The WizardWorks Group (612/559-5140) now offers Apollo Interactive, The Complete Insider's Guide, an interactive tour (with a company-estimated street price of $15) that teaches you about the Apollo space missions.

Advanced Illustrator

Trying to understand how to use curves and paths in Adobe Illustrator? Then check out Kenneth Batelman's



Adobe Illustrator Paths and Curves

Adobe Illustrator Paths and Curves, a $24.95, 400-page book from John Wiley & Sons (800/225-5945).

UTILITIES/TOOLS

Data Recovery

Offering recovery of trashed files and erased volumes, Total Recall's (719/380-1616) $249 Data Recovery Toolkit also includes backup software that works with optical, Bernoulli, SyQuest, hard, and floppy disks.

Serial Port Accelerator

Serial port not fast enough? Check out the Hustler External Serial Accelerator from Creative Solutions (301/984-0262). The $395 SCSI device lets you use fast modems on older Macs not equipped for today's fast modems.

VENDORS: TO HAVE YOUR PRODUCTS CONSIDERED FOR PUBLICATION IN *NEW PRODUCTS*, SEND A PRESS RELEASE WITH PRODUCT DESCRIPTION, PRICE, AVAILABILITY, AND READER CONTACT INFORMATION, PLUS OPTIONAL PHOTO OR SCREEN SHOT, TO NEW PRODUCTS EDITOR, *MACWORLD*, 501 SECOND ST., SAN FRANCISCO, CA 94107.

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Circle 102 on reader service card

Reviews

PowerWave 604 Series

FAST, SENSIBLY PRICED SYSTEM IS A GREAT VALUE



KEVIN CANDLAND

POWER COMPUTING'S POWERWAVE 604 series fulfills the promise of Mac clones: better prices and useful variations on Apple's technology themes. In its initial NuBus-based Power series, Power Computing couldn't substantially differentiate itself from Apple—essentially, it came down to a lower price, easier memory upgrading, choice of system components, and bundled software. Then came Apple's PCI-based Power Mac 7500 and 8500, and the Power models looked like has-beens.

With the PowerWave 604 series of PCI-based Mac clones it's a different story: all three models use the top-of-the-line PowerPC CPU, the 604 chip. And Power Computing doesn't offer just the 120MHz 604 used in Apple's Power Mac 8500/120 and the 132MHz 604 used in Apple's 9500/132. No, it is the first company to also use the new 150MHz 604, and so far it's the only one. In mid-November, Power Computing began delivering the first few PowerWave systems to customers, with broad availability expected by January 1996. (However, the 150MHz models are likely to be in short supply for several months, since chip production has just been ramped up.)

Power Computing has also delivered the first Macs capable of handling both NuBus and PCI cards. (Apple doesn't plan to sell dual-bus systems.) With a $249 riser card, two NuBus and two PCI cards plug into a PowerWave 604. (Without it, three PCI cards fit.) Unfortunately, Power Computing had none of the optional riser cards for *Macworld* to test; we reviewed the PCI-only models.

What a Deal

I'm a big fan of Apple's Power Mac 7500/100, a powerful desktop system with a nice design that permits easy upgrading. You'll pay $3200 to get one with 16MB of RAM, a 1GB hard drive, Ethernet, 2MB of video RAM, an upgradable CPU, a quad-speed CD-ROM drive, a mouse, and an extended keyboard. For the same price, you get Power Computing's PowerWave 604/120 in the same configuration—a Mac system that is 23 percent faster than the 7500 in real-world tasks, according to Macworld Lab tests.

Then there's the bundled software. Power Computing offers some truly useful business software: ClarisWorks 4.0 for basic word processing, data management, and graphics; Nisus Writer 5.1 for business-oriented word processing; Now Up-to-Date and Contact 3.5 for managing contacts and schedules; Now Utilities 5.0 for customizing file and menu behavior; FWB Hard Disk ToolKit 1.75 and CD-ROM ToolKit 1.5 for managing drives; and Intuit's Quicken 5.0, a personal

RATINGS Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

and small-business financial manager.

So what's the catch? There really isn't one. You don't get the 7500's audio- and video-input capabilities, but most people won't use those features anyway. I still like the 7500 a lot, but I like the PowerWave a little more.

Case in Point

Unlike Apple's, Power Computing's systems have video ports for both Mac-style and PC-style monitor cables and sense which port is in use at start-up.

Power Computing offers three PowerWave models—the 604/150, 604/132, and 604/120—which ship standard in a tower case, or in a desktop case for $50 less. The desktop case holds one drive less. Both cases have two internal drive bays (you get a hard drive in one bay). The desktop case has two additional bays, accessible from the front, for hard drives or removable-media drives (a CD-ROM drive is installed in one bay), while a tower case has three such bays.

The 7500's new case design makes it easier to add RAM and cache, since you can flip the floppy/CD-ROM drive assembly out of the way. That corrects a long-standing flaw in Apple case designs—difficult upgrading—that the 8500 still has. But it's hard to get the case back in proper alignment, and the little plastic leg that holds the case up while you're working can easily break off when you flip the drive assembly back down. To avoid this problem, Power Computing has designed the PowerWave motherboard so the RAM and cache don't go under the floppy and CD-ROM drives.

Another flaw in Apple's 7500 case is a metal wall behind the drive bay that leaves little maneuvering room when you're connecting the cables. In contrast, the PowerWave's assembly holding the internal drives tilts up so you can easily connect the SCSI and power cables.

Note that adding expansion cards is somewhat more complex with the PowerWave tower case than with the desktop version. You first have to take out the tower's metal bottom panel by removing two screws and sliding the panel out.

You can choose system components when ordering. For example, Power Computing offers Micropolis, Quantum, or Conner hard drives. The Micropolis in the machine we tested was noisy; however, for AV uses, it provides the constant data-transfer speed required to record CDs. Unfortunately, these drives are not as fast as the Power Mac 9500's, as Macworld Lab's Disk-Intensive test results show, and this can affect your performance a bit. If you really want a superfast hard drive, order a PowerWave with no drive and get your own drive.

Also, in a slightly confusing price structure, you pay separately for a cache card on the PowerWave 604/120, while the other models come with a cache card.

The Last Word

The PowerWave series is a sensible choice for anyone. It makes the Apple Power Mac 8500 model a good pick only if you want its midlevel audio- and video-input/output features. Similarly, the PowerWaves make it hard to justify buying a 7500/100 unless you need its business-level audio- and video-input. No third-party PCI cards are available yet that can add these features to a PowerWave, but that should change by summer.

For most people, I recommend the 120MHz and 132MHz models. The PowerWave 604/150 is the speed champion, but its high price means less bang for your buck. It's fair to charge a premium for the top of the line, but only a few people truly need that fast a system.

I applaud Apple for developing such an elegant architecture in the 7500 and 8500—remember, Apple remains the creator of the significant Mac system innovations—but I also applaud Power Computing for better capitalizing on that architecture in the PowerWave series.

—GALEN GRUMAN

PowerWave Series

PowerWave 604/120 ★★★★/7.6
PowerWave 604/132 ★★★★/7.6
PowerWave 604/150 ★★★★/7.7

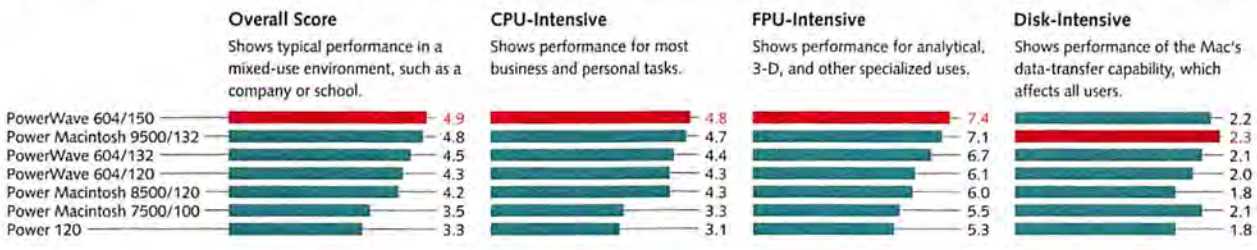
PROS: High performance; moderate price; easy access to RAM and drive bays; choice of system components. **CONS:** Tower design requires extra step to add cards; 604/150's price is not as competitive as the other models'. **COMPANY:** Power Computing (512/258-1350, info@powercc.com). **DIRECT PRICE:** 604/120 $3199 plus $225 for a 256K cache card, $400 for a 512K card; 604/132 (256K cache card included) $3699; 604/150 (512K cache card included) $4499; desktop versions $50 less.

Where to Get Top Speed: The PowerWave Series

= Best result in test. Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0) Products are listed in decreasing order of overall performance.

Power Computing is the first Mac clone maker out of the gate with the fastest PowerPC 604 CPU yet—the 150MHz chip. Combined with the same basic technology as Apple's for a noticeably lower price, that speed gives Power Computing the edge in the price/performance race and reminds us why people have clamored for competition within the Mac market for years.

The PowerWave 604/150 and 604/132 systems would have run even faster than shown here if it weren't for the Micropolis 4221-09M2 hard drive that Power Computing installed in them. Macworld Lab tests revealed that the PowerWave 603/132's speed was identical to the Apple Power Mac 9500/132's when we used Apple's faster Seagate ST3293ON in the PowerWave. And the hard drive factor cuts both ways: the PowerWave 604/120 outperformed Apple's 8500/120 because the IBM OPES-31080 drive in that model is slower than Power Computing's Micropolis drive. See "How Each Mac Stacks Up," in "The Best Mac for the Job," in this issue, for information on testing.—**Macworld Lab testing supervised by Danny Lee**



Speed Doubler 1.0.2

CONNECTIX MAKES A POWER MAC'S 680X0 EMULATION FEEL NATIVE

THE FOLKS WHO BROUGHT YOU RAMDoubler appear to have pulled off another miracle enhancement to the Macintosh Operating System. Connectix Speed Doubler is a collection of three system extensions designed to make your Mac run faster. The centerpiece of the collection, Speed Emulator, works only on Power Macs. This component replaces Apple's 680X0 emulator (which allows you to run older nonnative programs) with one that runs more efficiently. The Apple emulator in the original Power Macs performed at IIci to Quadra level. Speed Emulator improves that performance with an emulation scheme similar to the one used on the newest Power Macs (such as the 7500, 8500, and 9500), called dynamic recompilation. This emulation technique keeps translated 680X0 code in RAM, so the Mac can use the code again and again without translating it each time, thus improving overall performance. The original Apple emulator translated the code each time it was used, and did not keep it in RAM.

The other two components of Speed Doubler, Speed Access and Speed Copy, also work on 68030 or faster Macs.

The Numbers Add Up

When put to the test by Macworld Lab, Speed Doubler gets a big thumbs-up. In our standard application test suite, overall 680X0 emulation speed on a first-generation Power Mac was more than doubled. More significant is the fact that 680X0 emulation speeds on the newest Power Macs, which use Apple's dynamic recompilation emulator, were also faster. Disk cache improvements were slight, but noticeable.

Speed Copy's performance boost was less apparent on my 9500/120 (which, like all recent Macs, already has better Finder and runs up to three separate copy operations at the same time. To speed file-copying performance still further, the Speed Replace function replaces only changed files (similar to a feature available in Symantec's CopyDoubler). File deletion is also improved. The Security Erase feature erases file data from a drive (rather than just removing the file's reference from the file directory), so no one can retrieve the file with a file-recovery utility, such as Norton's. You can also delete files selectively, deselecting items in the trash window.

Speed Access replaces Apple's disk cache, which stores frequently used data from your disk drive in RAM. Speed Access not only improves cache performance but also makes programs launch faster.

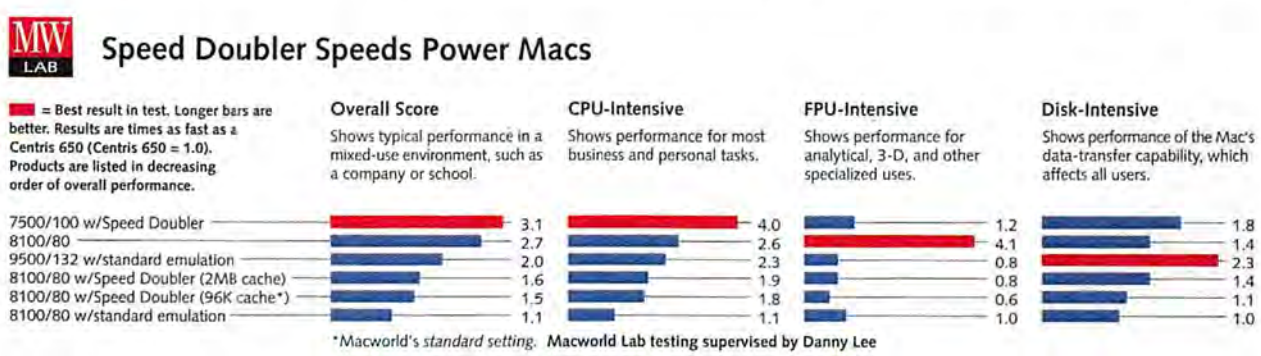
The third component, Speed Copy, provides faster Finder copying, has the ability to copy files in the background, copying speed than older models with older system software). The improvement was little better than 20 percent; it took the Speed Replace function to make the speed increase readily apparent.

Improving system performance has its drawbacks, though. Apple's 680X0 emulator is incorporated into the Power Mac's ROM and doesn't reduce available RAM. Speed Emulator needs 800K of RAM to replace Apple's emulator, plus extra RAM for its Speed Copy and Speed Access components. For example, Speed Doubler allocates 1/16 of total installed RAM to Speed Access as part of the installation process (you can increase or decrease this amount in the Memory control panel). In general, Speed Doubler works best in a minimum 16MB configuration.

Speed Doubler users have been posting reports of various bugs on the online services and Internet newsgroups. The company has been quick to address the problems; Connectix put two maintenance updates online within six weeks after the program shipped. There are still reports of continuing problems with PowerPC upgrade cards and programs such as Now QuickFiler and Excel 4 (the latter strictly on PCI Power Macs) that Connectix is investigating and hopes to fix in a future update.

The Last Word

I have not experienced a single problem with Speed Doubler on my 9500/120, however. Its performance is first-rate. Even my older 680X0 software feels native in regular use. Speed Doubler makes even the fastest Mac faster, and works seamlessly with most software. If you can give up a megabyte or two of RAM to let Speed Doubler do its stuff, you'll find it one of the most important utilities you can buy.—GENE STEINBERG



RATING: ★★★★/8.9 **PROS:** Incredible boost in 680X0 emulation on all Power Macs; noticeable improvements in Finder copies and disk cache performance. **CONS:** RAM hungry; assorted bugs. **COMPANY:** Connectix (415/571-5100, customerservice@connectix.com). **LIST PRICE:** $99.

Kai's Power Tools 3.0

MORE-POWERFUL PLUG-INS, MORE-BAFFLING INTERFACE

ANY DISCUSSION OF KAI'S POWER Tools (KPT)—a collection of texture and special-effects plug-ins for Adobe Photoshop—must begin with its unusual, sometimes bizarre, but always extravagant interface. This is one of the few pieces of software to violate Macintosh interface standards and get away with it: buttons dim when you're not using them instead of when they're inapplicable; you adjust settings by clicking on marbles and dragging words rather than using slider bars or entering numeric values. In fact, the only familiar Macintosh element is the pop-up menu.

Divergent Dialog Boxes

In KPT 3.0, the interface is more lavish and outrageous than ever. But it has also become distressingly inconsistent, with three varieties of dialog boxes. (Because KPT consists of Photoshop filters, MetaTools [formerly HSC Software] must present all filter options in dialog boxes.) The 4 core filters use one type of dialog box (see 1 in "Interface Gumbo"). Two dialog box variations—which go unexplained in the printed documentation—present the other 14 filters (see 2 and 3). These divergent dialog boxes differ in their previews, pop-up menus, and some options. MetaTools considers the new dialog boxes an improvement over KPT 2.1's single-shot commands, which offered no options, but 3.0's desultory variations are needlessly confusing and even irritating.

Improved Core Filters

KPT's most important filters have always been Texture Explorer, which lets you define random mathematical patterns, and Gradient Designer, the best tool I've used for creating gradations. Both are now significantly more robust. Texture Explorer generates infinite patterns that can fill any area without repeating, eliminating the schematic look associated with tile patterns. You can also scale, rotate, and position patterns. Texture Explorer and Gradient Designer let you view thumbnails of saved patterns and gradients, rather than simply select them by name. And you can change color brightness and contrast, blur color transitions, and adjust other characteristics with real-time feedback. These filters have always been a joy to use, and in KPT 3 they are faster and more powerful.

Version 3 also has two new core filters, Interform and Spheroid Designer. Interform lets you blend two parent patterns to form new offspring; you can favor one pattern or set both in motion, resulting in a continuous stream of possible offspring. You can even save a QuickTime movie of the mingling parents (although it's unlikely Photoshop artists will find much use for this). Spheroid Designer lets you create colored spheres, shine up to four lights on them, vary their colors and surface textures, and control their convexity. This filter has more limited uses than Texture Explorer or Gradient Designer (how many variations on sphere art does the world need?), but it's inarguably comprehensive.



Interface Gumbo Depending on what filter you select, the dialog box you see will be one of three basic types. One lets you see full previews and save settings for later use (1). Another also offers full previews but won't let you save settings, and makes the OK and Cancel buttons colored dots (2). The third has limited, sometimes inaccurate previews and a different system of options and pop-up menus (3); still, it's not every day you see a dialog box that looks like a broken shard of plastic with a drop shadow.

Lots of Little Filters

Though they lack hard-copy documentation, the remaining filters have been enhanced. The familiar Glass Lens and Page Curl filters offer more-reliable controls, 3D Stereo Noise creates color stereograms, and a new Planar Tiling filter repeats images at various sizes and angles. Other plug-ins arrange repeating images in rotating, concentric shapes and kaleidoscopic patterns. These filters permit a wider range of variations and better previewing than their predecessors.

The F/X filters are useful—you can blur images, trace edges, add noise, and apply other pixel convolutions—but their implementation leaves something to be desired. The filters are listed in the awkward Lens F/X dialog box, which looks like an abstract map of the United States with knobs protruding from it (see 3 in "Interface Gumbo"). The good news is that you can switch between F/X filters without closing the dialog box; the bad news is that its design is labor intensive (you change values by dragging the knobs rather than by entering numbers from the keyboard), and the previews can be inaccurate (the effect is applied only to a detail in the image, without regard for pixels outside the preview).

The Last Word

KPT 3.0 is more capable, powerful, and speedy than previous versions. It's also harder to use, a problem aggravated by the inadequate printed documentation. (The built-in help is good but lacks much-needed figures and doesn't let you experiment with filters as you read.) KPT remains the most innovative plug-in suite available for Photoshop; I just wish MetaTools had given a little more thought to what drew us to the Mac in the first place—ease of learning and ease of use.

—DEKE McCLELLAND

RATING: ★★★★/8.3 **PROS:** Excellent enhancements to Texture Explorer and Gradient Designer; secondary filters are flexible and plentiful. **CONS:** Many filters are not documented in print; inconsistent interface design. **COMPANY:** MetaTools (805/566-6200, metasales@aol.com). **LIST PRICE:** $199.

PowerBook 5300c

APPLE ADOPTS PC TECHNOLOGY BUT LACKS INNOVATION

WHAT A BEAUTIFUL SCREEN! Nothing about the new PowerBooks leaves a stronger impression than the larger (10.4-inch) screen that is standard on the 5300 and 190 series. It has the same viewable area as a 13-inch monitor, so you can now actually read without squinting.

Of course, what most people will crave is the PowerPC 603e CPU inside the 5300; it promises blazing performance. You'll get good performance from a 5300—I felt like I was working on a desktop Power Mac—but the performance is only so-so when you look at it from some other perspectives. First, PC notebooks using 75MHz Pentiums are much faster than 100MHz 603e-based PowerBooks. Second, the overall speedup from a 500-series PowerBook (which uses a 33MHz 68040) is only double, not triple, what you'd expect based on what the PowerPC did for desktop Macs.

While their squarer design and black color differentiate the 5300's from the 500's, some features are similar: keyboard, battery, expansion ports, and Trackpad.

What's New

I used a PowerBook 5300c (with an active matrix screen—a must for all-day use) for about a week for normal business work at the office and at home. The unit had 16MB of RAM and a 750MB hard drive.

Two PC Card slots let you add fax modems, network cards, and credit card–size hard drives. (Gone are the built-in modem and Ethernet of the 500 series.) The Global Village PowerPort Platinum



KEVIN CANDLAND

Pro combined Ethernet and 28.8-Kbps fax modem card ($599; 408/523-1000, **sales@globalvillage.com**) was a snap to use.

A built-in infrared (IR) transceiver provides a wireless connection to Macs equipped with an IR pod, the only one of which so far is Farallon Computing's $79 AirDock (510/814-5100, **info@farallon.com**). I found using the AirDock and the 5300c's built-in IR port a breeze at distances of several feet and with a clear line of sight between the PowerBook and the AirDock. The AirDock does not work yet with any Mac using System 7.5.2 because of flaws in Apple's Open Transport networking architecture. Apple's IR technology is also not compatible with that in PC notebooks.

The 5300c has an expansion bay whose floppy drive can be removed and replaced with other peripherals. So far, the only real options are a magneto-optical drive and a couple of AC/DC adapters. What I'd really like is a CD-ROM drive, but the bay is too small.

Fit and Finish

The PowerBook 5300c has a few deft touches and niceties, including a power-on indicator light that works even when the case is closed. The controls to remove an expansion-bay device hinder accidental removals but don't get in the way. And Apple thoughtfully includes a PC Card carrier that fits in the expansion bay.

But there are rough edges. For example, you have to create your own backup set of 22(!) system floppies. And the positioning of the power key is awkward—it's above the delete key, and I kept hitting it by mistake. I continue to wish for page-up and page-down keys, as well as arrow keys arranged in an inverted-T. Inserting a PC Card was more difficult than I expected. The slots' bomb-bay doors keep junk out, but they also make it harder for you to see if your card is inserted properly.

The Last Word

I like the 5300c. The screen and performance have done a lot to make this PowerBook the near-equal of a desktop Mac. But I'm not about to lay out its $4500 estimated price. If you have a PowerBook already, don't be in a hurry to replace it. The PowerBook 5300c offers what any capable notebook should. No less, but no more.—GALEN GRUMAN

RATING: ★★★/5.9 **PROS:** Twice as fast as its 68040 ancestors; vivid, big active matrix screen. **CONS:** Essentially a PC notebook running the Mac OS—but more slowly and with shorter battery life. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $4500 (16MB of RAM, 750MB hard drive).

MW LAB PowerPC Doubles the PowerBook's Performance

= Best result in test. Longer bars are better. Results are times as fast as a PowerBook 520c (520c = 1.0). Products listed in decreasing order of overall performance.

The PowerPC 603e's clock speed triples that of the 68040 chip it replaces, but the newest PowerBooks only double the performance, since factors like hard-drive speed, video display, and bus architecture tamp down the 603e's speed. Note that overall the gray-scale 5300 outperforms all color 5300 models due to the faster screen redraw on a noncolor system. See "How Each Mac Stacks Up," in "The Best Mac for the Job," in this issue, for information on testing.—**Macworld Lab testing supervised by Danny Lee**





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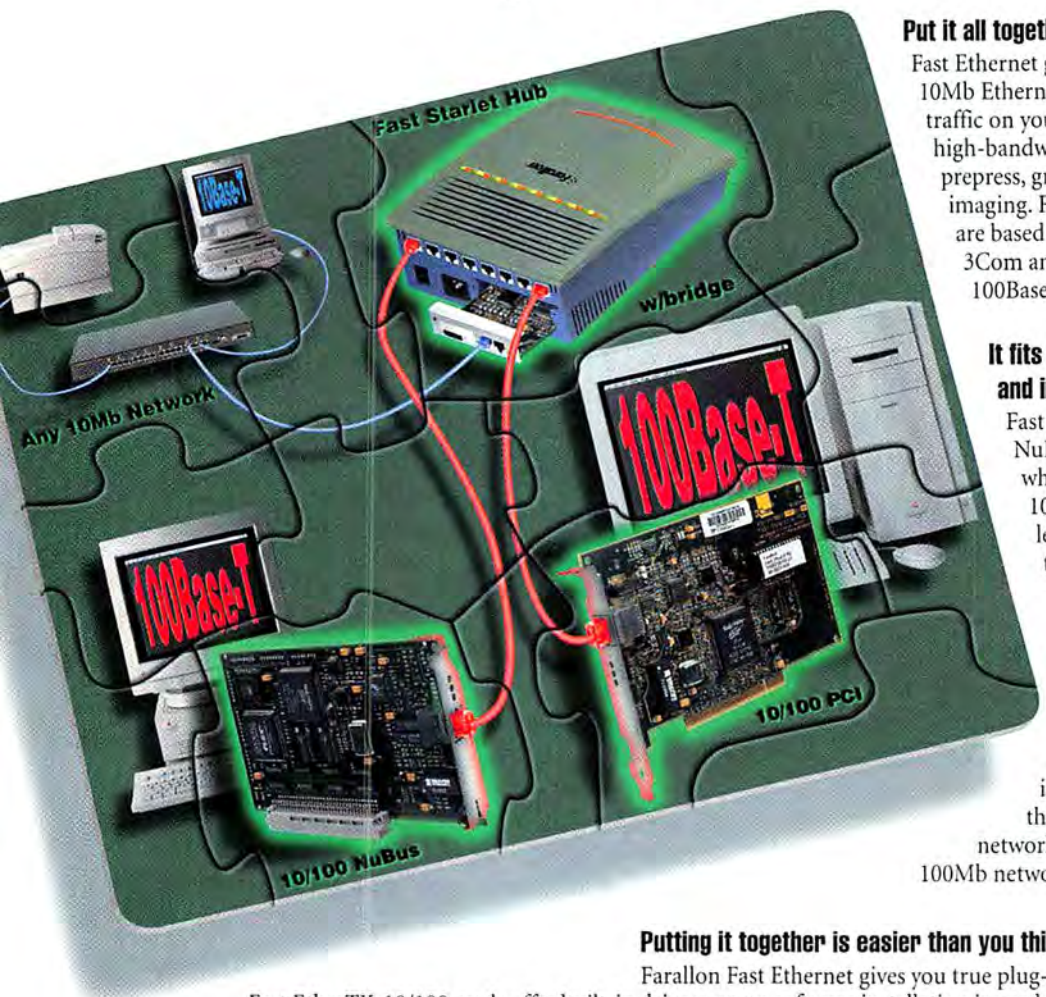
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WordPerfect 3.5

POPULAR WORD PROCESSOR ADDS HTML EDITOR

WHAT KIND OF IMPROVEMENTS can you expect from a four-tenths-of-a-point upgrade? The answer, in the case of Novell's WordPerfect 3.5, is a handful of unrelated refinements and additions, from envelope printing to HTML editing. But just what do these scattershot changes amount to, and are they worth the cost of upgrading?

One of the program's most useful improvements is the new Print Envelope command, which automatically addresses an envelope and places your return address in the corner (see "Take a Letter"). Alternatively, you can choose delivery and return addresses from pop-up lists of user-defined entries or enter them manually. You can also generate zip code bar codes and other standard postal markings and print multiple envelopes with a single merge command.

Also new is WordPerfect's text-to-speech function, which uses Apple's PlainTalk and MacinTalk to read text aloud. The ruler and button bars have undergone minor but thoughtful cosmetic changes as well. And the new Make It Fit command simplifies the format juggling required to move a dangling line or two onto the previous page. Make It Fit asks which of six parameters (font size, line spacing, and the four margins) you're willing to alter, then takes care of the rest.

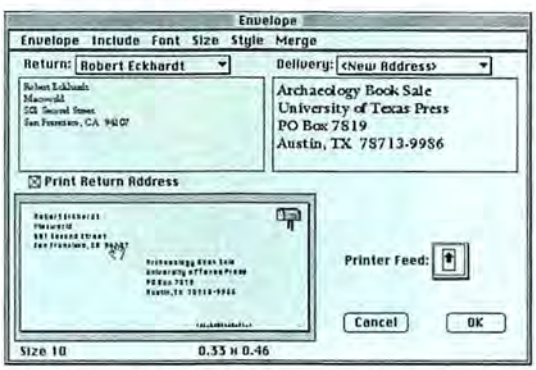
Although touted as new, the 80 or so document templates in 3.5 really aren't—they just improve on 3.1's Document Experts. Some are overkill, a few are real time-savers, and others are a godsend to the design-impaired.

Bookmarks and Hyperlinks

Higher on the usefulness scale are the new bookmarks and hyperlinks. The bookmarks are easy to create and let you jump quickly around a document by selecting a tag from a pop-up list on the bookmark ruler. But unless you format each one manually, the bookmarks themselves are invisible in the document. Hyperlinks, on the other hand, are clearly marked by blue, underscored type (the standard World Wide Web format for a link). Although you can also select hyperlinks from a pop-up list, they function best as clickable, in-text buttons that instantly send you elsewhere in your document (or to a different document) or run a WordPerfect macro.

New HTML Editor

WordPerfect 3.5's most notable change is that it lets you create World Wide Web pages using HTML (HyperText Markup Language). You can now select many HTML codes from pop-up menus in a new HTML ruler. You can also specify Web-page titles; choose text, link, and background colors; insert graphics; add page dividers; and assign Uniform Resource Locators (URLs) to hyperlinks. As you work, you see a fairly ordinary WordPerfect display that is neither raw HTML code nor the actual Web page. A Preview button switches you to the Web browser of your choice (Netscape Navigator 1.1N is included) so you can see how the page will look with that browser; unfortunately, there's no convenient way to edit the HTML code.



Take a Letter In WordPerfect 3.5, you can choose the font, size, and style of addresses; adjust their positions by dragging them in the preview window (as shown here); and select one of six standard envelope sizes or specify a custom size.

Beginners beware: the documentation explains almost nothing about HTML, its implementation in WordPerfect, or which WordPerfect formats translate into HTML. Experienced Web users will be pleased to know that WordPerfect automatically converts tables into HTML code (though it does this imperfectly). You *won't* be happy to hear that you have to enter HTML code manually to create forms, that WordPerfect lists don't convert to HTML lists, and that there's no easy way to convert existing WordPerfect styles into HTML formats. Overall, WordPerfect's HTML editor is far less versatile than the new breed of Web authoring tools.

The Last Word

In *Macworld*'s most recent high-end word processor roundup ("Word Processing Powerhouses," March 1995), I noted that although Microsoft Word 6.0 is an unwieldy, exasperatingly sluggish behemoth, it easily surpassed WordPerfect 3.1 in the breadth and depth of the features serious writers need. Unfortunately, with its limited changes and improvements, WordPerfect 3.5 leaves intact most of 3.1's major shortcomings (for example, no outliner, no character styles, no true glossary, and weak search-and-replace) along with many of its less serious warts (such as the inability to split a window and its sometimes screwball scrolling).

On the other hand, WordPerfect retains the clean, uncluttered interface for which it is justifiably famous; new import filters make it more convenient to use with page-layout programs; and the list price is about half what it was a year ago. If you need a new word processor and don't require Word 6's high-end features, WordPerfect deserves more serious consideration than ever before. If you have WordPerfect 3.1, however, and don't really need bookmarks, hyperlinks, or envelope printing, you might want to skip this version. And if you're serious about HTML editing, consider Adobe's PageMill instead; it costs only slightly more than upgrading to 3.5 (registered upgrades are $59; competitive upgrades are $89).—ROBERT C. ECKHARDT

RATING: ★★★/6.7 **PROS:** Often helpful HTML editor; easy envelope printing; automatic fitting of text to specified number of pages; bookmarks and hypertext links; new, low price. **CONS:** HTML editor is limited and poorly documented; retains most of 3.1's shortcomings. **COMPANY:** Novell Business Applications (801/225-5000). **LIST PRICE:** $189.

PressView 21 SR

THE BEST PROFESSIONAL-QUALITY DISPLAY GETS BETTER

WHETHER YOU'RE CREATING color separations or designing multimedia images, the single most important factor in producing accurate colors is your monitor. Although you can purchase screen-calibration packages that let you adjust the colors of virtually any display, these solutions assume that your monitor is capable of displaying accurate colors in a variety of lighting situations—a rather optimistic leap of logic. The optimal solution is a complete display-calibration system, including monitor, calibrating hardware, and advanced software controls. And there is no better system for the Mac than the Radius PressView SR.

Distractions and Connections

The PressView 21 SR's charcoal gray case may seem like a trendy affectation, but in truth its neutral color aids the perception of accurate on-screen color. A matching hood adheres to the top and sides of the case, protecting the screen from ambient light. And lest the colors from your clothes reflect onto the screen, you can don a special black lab coat included with the monitor. Short of spray painting your office black, Radius has made every effort to remove light and color distractions from your field of vision.

Though the front-panel controls manipulate brightness, contrast, and screen geometry, you can achieve truly accurate colors only by using the PressView and ProSense software. The software communicates the settings to the screen through the Mac's serial port. If you print over Ethernet, connecting the monitor to the Mac's serial port is no problem. However, if you have your modem hooked up to one serial port and your printer hooked to the other, you have to disconnect the modem or printer to use the PressView software—a considerable inconvenience, to say the least—or purchase a third-party serial-port expansion board.

You can use the PressView software to adjust on-screen color and geometry, overriding the front-panel controls. These software controls are exhaustive, covering everything from white point and color purity to pincushioning, keystoning, and other screen-area distortions. You can save a different collection of settings for each screen resolution and lock the settings to prevent accidental adjustments.

Running the Gamut

The PressView 21 SR displays colors most accurately when combined with one of Radius's newer video boards, including the NuBus-based LeMansGT and Thunder IV, and the Thunder 30 series for PCI Macs. Each of these products provides a



ROBERT FERRY/SCREEN IMAGE PHOTONICA

10-bit digital-to-analog converter (DAC) chip and is capable of calculating a total of 10 bits of data for each of the 3 color channels, for a total of 30 bits. Though the LeMans board introduced 30-bit capability more than a year ago (see *Reviews*, October 1994), the PressView 21 SR is the first monitor to take advantage of them. With 30-bit color, you always have the ability to view any of 16 million colors on screen, regardless of your calibration settings.

With a PressView 21 SR and a board with a 10-bit DAC, the 24-bit on-screen gamut is shifted inside the much larger 30-bit on-board gamut. The colors are more vivid, the gradations are smoother, and the details are crisper. Adjusting the white point on a generic monitor-and-video-board combination, in contrast, compresses the on-screen color gamut by 50 percent or more.

Like many previous Radius monitors, the PressView 21 SR includes an ADB calibrator that attaches to the screen with a suction cup. I was chagrined to find that the suction cup left a mark on my screen that has not completely disappeared despite two months of vigorous cleaning. A Radius representative informed me that the ring was the result of a manufacturing residue that has been removed from all currently shipping units, but you can imagine how a little brownish ring might drive you a tad batty if you've gone to the extreme of wearing a black lab coat to diminish color reflections.

The ProSense calibration utility is easy to use, almost identical in appearance to the SuperMatch utility included with previous monitors. ProSense generates monitor profiles in ColorSync, EFI EfiColor, Kodak Color Management System, and Agfa FotoFlow formats. You can also save an Adobe Photoshop monitor profile and use it in conjunction with one of four predefined color lookup tables—keyed to 3M Matchprint and other high-end proofing systems—for extremely accurate viewing of CMYK images.

Because it includes nonnative software from Kodak, the current version of ProSense requires the installation of Software FPU on Power Macs, whether or not you intend to generate Kodak profiles. A patch is in the works and should be shipping by the time you read this.

For the cost-conscious, the PressView SR also comes in a 17-inch size, priced at $2399. Aside from the size of the tube, the monitors are identical, even capable of displaying the same number of pixels on screen (1600 by 1200 maximum, depending on your video board). As an added bonus, you can view photographic images at 133 pixels per inch on the PressView 17 SR—compared with 100 ppi on the 21 SR—closer to the resolution at which the images will ultimately print.

The Last Word

The PressView 21 SR is expensive, especially when you consider that you also need a $1500 video board to get optimum performance. But color and prepress professionals won't find a better monitor for their money.—DEKE McCLELLAND

RATING: ★★★★/8.6 **PROS:** Neutral gray case; takes advantage of video boards with 10-bit DACs; excellent calibration functions and display controls. **CONS:** Have to devote serial port to monitor; requires Software FPU on Power Mac. **COMPANY:** Radius (408/541-6100, info@radius.com). **LIST PRICE:** $3999.



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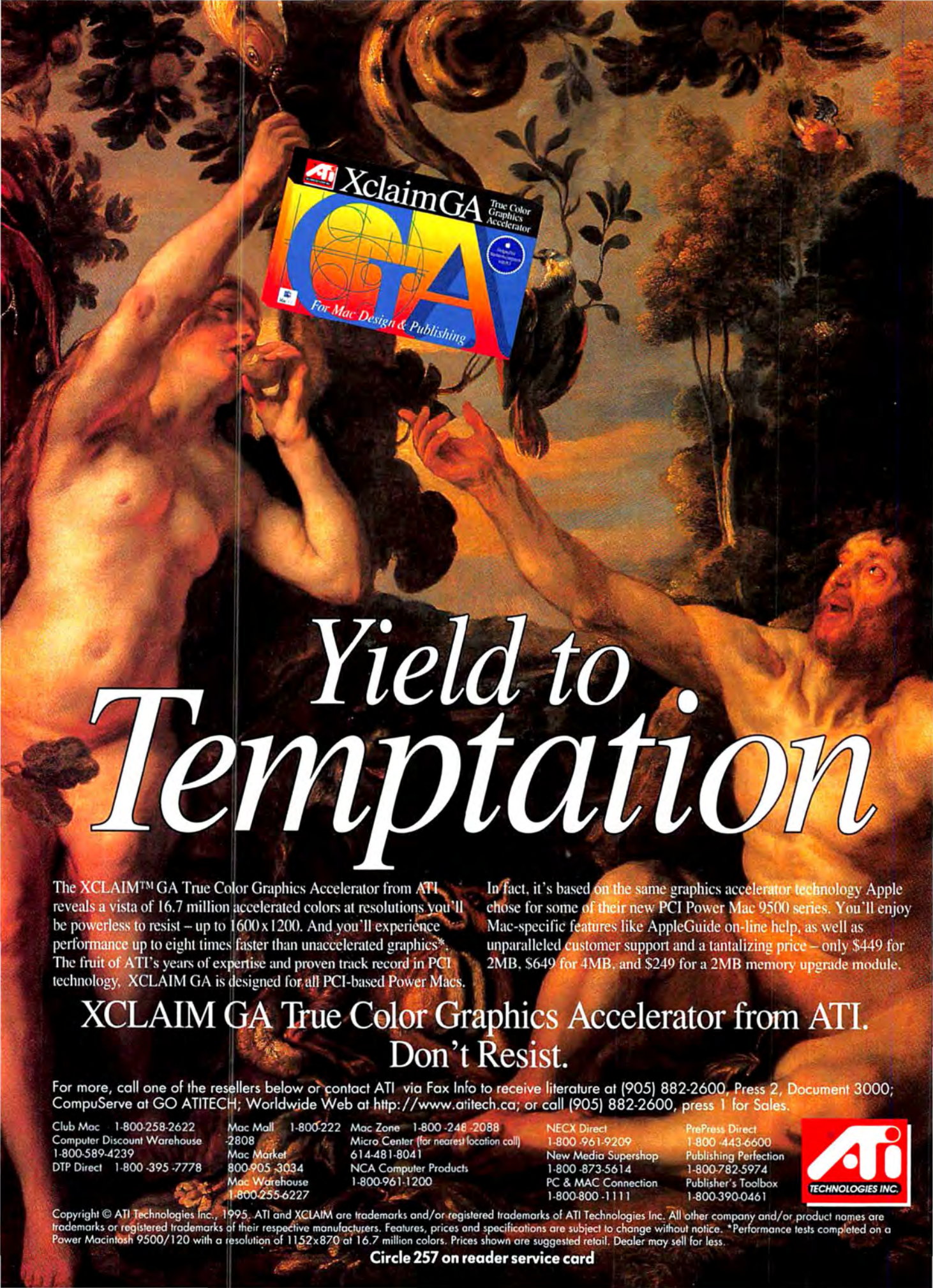
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Quicken Deluxe 6

BEST-SELLING PACKAGE GETS BIGGER AND MOSTLY BETTER

THIS YEAR'S EDITION OF QUICKEN adds convenience features and makes the program easier to use. Actually, Quicken 6 comes on floppies and includes just the program, but this review covers the CD-ROM version, called Quicken Deluxe 6, which includes multimedia-based financial advice, a home-inventory program, and a mutual-fund database.

Intuit has completely revamped the budgeting section of Quicken, making it much easier to set up and use. A new Budget Monitoring window tells you if you're over budget for the month using color-coded bars: green denotes financial freedom, and red means monetary mayhem.

The investment area of the program has also had a significant face-lift. The new Portfolio view lets you modify all your investment information in one window. Several new performance measures, including average cost per share, return on investment, and total dollars invested, have been added. You can see details of any particular investment, with a performance graph and price history, and a new Watch List tracks securities that you are thinking of buying. The CD-ROM includes a program called Mutual Fund Finder, with a historical database and Morningstar rankings of 4400 funds. When you tell the program how much risk you can handle, how much you can invest, and what kind of fund you want, Mutual Fund Finder searches the database and lists funds that meet your criteria. You'll see lots of detailed information on past performance (with both text and graphs) and even a toll-free number.



Launching Pad From Quicken Deluxe 6, you can access any of the other programs in the package.

Reports have been improved. You can now hide or show columns, change the sort order, and move the page breaks. The reports interface has been reorganized; you choose all the reports from a single window.

The new Quicken Guide is an excellent use of Apple Guide, providing detailed help for most of Quicken's features. The best thing about the guide is that it doesn't just focus on new users; experienced Quicken users can still get a lot out of the Tips and Guided Setup portions.

Multimedia Advice

The CD-ROM has two sections that provide expert advice via video clips. Ask the Experts offers financial advice from two experts, authors Jane Bryant Quinn and Marshall Loeb. You first fill out a short user profile, giving your age, the number of kids you have, and your rough income. Then you choose from five categories, such as Planning, Life Events, and the like. Each category presents several questions, such as "Is buying a home better than renting?" Clicking on the question plays a video clip from one or both of the experts. The program plays the most appropriate clip for your profile.

Tips from the Team is the other video section, with 14 members of the Quicken development team providing insider tips on using various features. Some tips are more valuable than others, but on balance, they're worth a look.

Poor Relations

One unwelcome change is the lack of a printed manual; the user manual is on the CD-ROM as an Apple DocViewer file. As with most electronic books, it is annoying to use and virtually impossible to browse, and illustrations are difficult to read. This is especially painful because the Quicken user manual is one of the best in the entire software industry. The company offers a printed manual for an extra $15, which is hardly a consolation.

The Quicken Home Inventory (QHI) program lets you take stock of your possessions for insurance purposes. The program works, but it's a real disappointment. The user interface is clunky; you must constantly switch between a list view (items in a particular room), and a detail view (information on a specific item). Double-clicking on an item in the scrolling list view transfers that item to the inventory list on the left of the screen (you can't drag and drop). Then you must enter data—serial number, make and model, insurance policy, and so on—in the detail view, which you access by clicking on the Detail button (there's no ⌘-*key* equivalent). QHI calculates the resale value of an item as a percentage of the replacement cost, but this calculation doesn't update if you change the replacement cost. At the end of this process, you'll have a home inventory—if you can stand to finish it. QHI is slow, too, even on a Power Mac.

Transmitting Your Money Online

I was unable to test Quicken's Online Banking capability. This feature should be implemented via a free upgrade by the time you read this. Online Banking will let you get account balances from (and transfer funds between) your checking, savings, and some credit card accounts; and it will let you download transactions from your bank directly into Quicken. As in Quicken 5, you pay bills electronically via the existing CheckFree service, though an Intuit spokesperson told me the company would begin offering its own payment service later in 1996. If you've been dubious about the cost of home banking, for the first time these services are being priced so that a single transaction costs less than a postage stamp.

The Last Word

Quicken has held the top spot among personal-finance programs for several years, primarily because of its ease of use and deep features list. With version 6, Intuit revamped the budgeting and investment areas of the program. The addition of the extra content on the CD-ROM increases the package's value. Quicken Deluxe 6 is simply the best personal financial software available on the Mac.—TOM NEGRINO

RATING: ★★★★/8.3 **PROS:** Improved investment, help, and convenience features; better reports; good multimedia advice. **CONS:** Mediocre home-inventory program; printed manual costs extra. **COMPANY:** Intuit (520/295-3220). **LIST PRICE:** $59.99.

Claris Impact 2.0

EASY AND AFFORDABLE BUSINESS-GRAPHICS SOFTWARE

WHILE CLARIS POSITIONS Impact as a program for producing business graphics—org charts, flowcharts, data graphs, timelines (Gantt charts), outlines, and calendars—that's only part of its capabilities. Object-oriented drawing, word processing, and presentation functions make Claris Impact versatile enough to address a range of corporate communications tasks. Managers and small-business owners can use it to produce multicolumn newsletters, multipage reports, large charts, and computer-based presentations.

Even business-graphics novices will find Claris Impact accessible. Automated functions, such as predefined graphic styles, streamline chart and presentation production. In fact, the process of creating charts is so automated that anyone can build good-looking business graphics the first time out.

New features in 2.0 include more data-charting options, the ability to draw graphs and charts directly from imported data, and seven new flowchart-symbol sets (the program comes with an extensive collection of ready-to-use charting symbols and clip art). Added cross-platform support enables Mac and Windows computers to exchange files without translation problems.

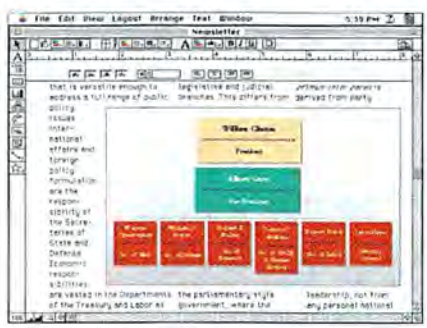
Claris Impact alters the look of its well-integrated document-production environment based on the type of document you're creating. The application asks what you want to do and opens the right document type. You build reports in a word processing–style window, suitable for multipage, text-intensive projects such as newsletters. You create drawings in an object-oriented workspace that can expand beyond standard page sizes, as is often necessary with large-scale timelines. Presentation documents rely on the familiar sequential-image approach, perfect for producing overheads.

You use identical tools for building charts, drawing objects, and controlling attributes such as color and line width for all the document types; for instance, you can build charts inside reports or put text blocks inside drawings. To build a chart, you simply drag out a frame with the tool for the specific type of chart, and the chart is immediately available for use. In an organizational chart, for example, you can just start entering names, moving elements around, and adding bureaucratic layers.

Claris Impact's charts are intelligent. When you reposition an element on a flowchart, the program redraws the connecting lines. If you change the duration of an element in a timeline, the program recalculates the schedule for all linked elements (you can set milestones to mark deadlines that won't change).



Changing Styles Claris Impact's Styles function lets you easily build charts with coordinated colors and graphic elements.



Versatile Documents Claris Impact's integrated approach lets you easily combine business graphics with text elements to produce everything from newsletters to presentations.

To produce charts from imported tab-delimited text files created in other programs, such as Microsoft Excel and FileMaker Pro, you import the data and select the fields to be graphed, and the application automatically builds the chart. You're not limited to data graphs, either; for example, you can use date fields from a database file to construct a project's timeline.

Claris Impact 2.0 comes with color-coordinated graphic-design schemes (Styles) that you can apply to individual charts or to entire presentations. Unlike the styles of version 1.0, these styles have been optimized for printed black-and-white output. Consequently, the beautiful images of your on-screen presentation won't turn into muddy laser-printed handouts.

Enhanced presentation capabilities include 11 additional slide transitions, such as wipes, dissolves, and uncover effects; an integrated outliner that makes it easier to organize topics and subtopics; and a slide sorter, which displays thumbnails that let you rearrange the sequence of a presentation. Sorely missing from version 1.0, these features make Claris Impact a more competent and useful presentation tool.

Simple but useful online tutorials make learning the ropes easy. Unfortunately, the rewritten, shortened, and simplified manual is a step backward. It still does a reasonable job on the basics, but it's not as informative as the previous version. Some sections, such as those on linking text frames and wrapping text around graphics, are downright confusing. As so often happens, an attempt to use nontechnical and nonthreatening language results instead in passages that obscure rather than enlighten.

The Last Word

In addition to offering a useful collection of graphing and charting options, Claris Impact 2.0 has the versatility to help you take on anything from a multipage report to computer-based presentations. Sure, dedicated charting and presentation programs can do more, but if you're an overworked corporate manager looking for accessible and competent business graphics tools, you'll appreciate Claris Impact's functional integration, ease of use, and value for the money.

—CARLOS DOMINGO MARTINEZ

RATING: ★★★★/8.0 **PROS:** Easy-to-use document-production tools. **CONS:** Simplified manual can be confusing. **COMPANY:** Claris (408/987-7000; info@claris.com). **COMPANY'S ESTIMATED PRICE:** $99.

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Touchpads

THREE NEW INPUT DEVICES

FIND IT UNNATURAL TO POINT AND click with a mouse or trackball? One of the new touchpads may be your salvation. Like the Trackpad on Apple's newest PowerBooks, these input devices let you move the cursor by sliding your fingertip (but not a fingernail or stylus) along the smooth, rectangular surface and click by lightly tapping your finger on it.

TouchPad

The sexiest-looking of the bunch, the Touché TouchPad would look right at home on the bridge of the starship *Enterprise*. (It's also the only touchpad that comes close to matching the PowerBook's dark case.) I also like Touché's solution to an annoyance that results from the pad's small active area (a problem shared by all touchpads): when you're dragging an icon, your finger may hit the edge of the pad before the cursor has reached its destination, forcing you to lift your finger and repeat the movement. The TouchPad's Edge Motion feature, which you activate with the control panel, keeps the cursor moving even when your finger runs out of room. The control panel also lets you specify how the pad should respond to finger taps. For example, you can set the TouchPad to drag-lock when you tap and glide your fingertip along its surface, so you can lift your finger without dropping the object you're dragging.

Unfortunately, the TouchPad suffers from a few serious limitations. Unlike the GlidePoint and QuePoint, the TouchPad doesn't let you customize the operation of its control-panel buttons, the claim "programmable buttons" on the package notwithstanding. (That's probably just as well, because the two buttons are so narrow and hard to press they're too difficult to use anyway.) And while the large, curved surface in front of the pad may look cool, it serves no real purpose.



ROBERT PERRY

Clockwise from top left: Alps Electric's Desktop GlidePoint, MicroQue's QuePoint II, and Touché's TouchPad.

Desktop GlidePoint

Even though it's a bit more utilitarian in appearance than the TouchPad, Alps Electric's Desktop GlidePoint comes out ahead in several areas. The most obvious improvements are in the GlidePoint's three buttons, which are larger and easier to press than the TouchPad's. A control panel lets you assign one of nine functions to any button. The control panel also lets you specify the GlidePoint's orientation, so you can use it with any side of the pad facing you. Another plus is a detachable base that clamps onto four short pegs under the pad. You can tilt the base at three angles to position the GlidePoint more comfortably. (It also makes the pad less prone to sliding around on your desk.)

Like the TouchPad, the GlidePoint has an adjustable drag-lock setting on its control panel. Say you lift your finger from the pad while dragging an item; the pad registers that as a release only after a user-specified delay, giving you time to reposition your finger and resume dragging. The control panel also lets you adjust cursor response and acceleration to suit your work style.

QuePoint II

I didn't expect to find much difference between the QuePoint II and the GlidePoint. After all, the two pads use identical sensing technology, and both sport a rectangular shape with buttons on the sides and bottom. On closer inspection, though, it's plain to see that the engineers at MicroQue have done their homework. For example, the QuePoint goes beyond the GlidePoint's suite of button functions with an additional setting called Slow Mode: a click of a button overrides the current speed and acceleration settings, slowing the cursor to a snail's pace for fine adjustments. Another welcome feature is an extra ADB connector. While it may not seem crucial, a spare port can be a godsend if you like to keep more than one ADB device hooked up.

I also like being able to customize the QuePoint's functions, including button actions, cursor acceleration, and pad response, for specific programs. When an application becomes active, its QuePoint settings load automatically. There's even a tutorial program that teaches you how to use the QuePoint. The only features it doesn't offer are an adjustable base and the option to adjust the automatic-release delay in drag-lock mode.

The Last Word

If you're convinced your mouse is to blame for the pain in your arm, wrist, or hand, you may be tempted to turn to a touchpad for relief. After a few weeks of using these pads, however, I noticed that my index finger was beginning to ache—perhaps because it was forced to carry more of the workload than with my mouse. If you decide to try a touchpad in spite of the drawbacks, the QuePoint's excellent software makes it the clear winner in this group.—FRANKLIN TESSLER

Desktop GlidePoint

RATING: ★★★/6.0 **PROS:** Adjustable base and cursor-release delay. **CONS:** Less stable when used without base. **COMPANY:** Alps Electric (408/432-6000). **LIST PRICE:** $99.95.

QuePoint II

RATING: ★★★★/7.0 **PROS:** Customizable application settings; extra ADB connector. **CONS:** No adjustable base. **COMPANY:** MicroQue (801/263-1883, 100015.715@compuserve.com). **LIST PRICE:** $79.95.

TouchPad

RATING: ★★/4.3 **PROS:** Edge-detection feature. **CONS:** Buttons are small and can't be programmed. **COMPANY:** Touché Technologies (612/830-1414). **LIST PRICE:** $59.95.

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DrawTools 1.0

EXTENSIONS ADD COLOR, SHAPE, AND OBJECT TOOLS TO FREEHAND AND ILLUSTRATOR

GRAPHIC ARTISTS WHO REGULARLY use Macromedia FreeHand 5.0 and Adobe Illustrator 5.5 will find the DrawTools extension collection a useful complement to their professional illustration tools. DrawTools organizes its 17 filters into three extensions—Move with 5 object-positioning filters, Color with 5 color-management filters, and Shapes with 7 object-projection filters that produce 3-D effects.

All three extensions are installed in and accessed from Illustrator's Filter menu. However, because FreeHand provides similar built-in object-move tools, only the Color and Shape extensions are installed in FreeHand's Xtras menu.

Color Tools

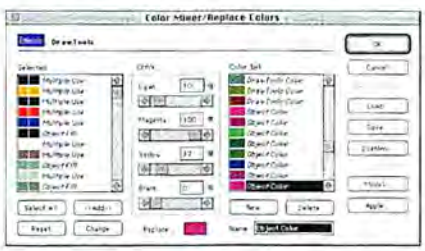
The Color extension provides filters for editing color curves, mixing and replacing colors, producing multitones, randomly adding or replacing object colors, and converting color images to gray scale.

The Edit Curves filter provides a dialog box where you can recalibrate colors by adjusting their component parts. You choose the color model from a pop-up menu and manipulate the individual color ramps as lines on a graph. You can add points to make more complex curves, turn curves off to isolate individual color channels, and save graphs for future use. This filter provides excellent control of color parameters, letting you adjust variables such as saturation and density, and then preview the changes before applying them to the image.

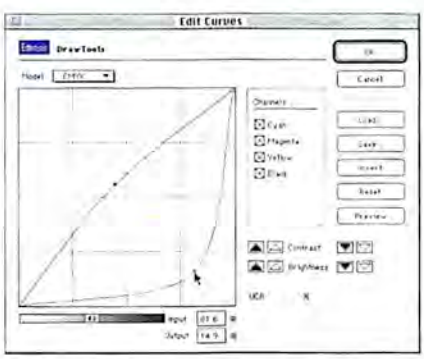
The Color Mixer/Replace Colors filter lets you change selected colors, mix new colors by moving the sliders, and load saved color sets. With the Multitone filter, you can recast an image with a single tone, produce a duotone effect, or apply multiple color tones.

The Random Replace filter automatically changes the colors in an image to randomly selected colors to produce an entirely new, and usually pleasing, color scheme. The Gray Scale filter converts a color image into gray-scale tones. You can apply both effects to selected objects or to entire documents.

There are limitations. DrawTools' Color filters don't work on pattern fills with either program or on gradients in FreeHand. By breaking some programming rules for extensions, DrawTools lets you edit gradients in Illustrator; however, those changes disable various safeguards, such as Undo, so use this capability cautiously. Also, DrawTools' filters can't create spot colors, and if you edit a spot color DrawTools converts it to a process color. Still, DrawTools' Color filters are a wonderful addition to FreeHand and Illustrator, providing many of the color-management capabilities of programs like Fractal Design's Painter and Adobe Photoshop.



Changing Colors The Color Mixer/Replace Colors filter lets you modify an illustration's existing colors, replace them, or mix new process colors.



Calibrating Color The Edit Curves filter lets you calibrate colors by reshaping individual color-model curves on a graph.

Shapes Projections

The Shapes extension projects objects over spheres, cylinders, cones, diamond parallelograms, waves, and a flexible free-form mesh, to produce 3-D effects.

With FreeHand, you access the Shapes filters from a floating palette. You can drag a filter icon directly onto an object to apply the effect automatically, at the current settings. If you drag the filter icon onto the floating palette's preview box, a dialog box for altering filter settings appears. For all filters, you can specify an object's dimensions (numerically or via sliders) and preview it for fine-tuning your changes. In addition, the wave and free-form filters let you directly manipulate the object-defining mesh.

With Illustrator, only the free-form filter's dialog box offers similar feedback. With the others you must select an object, access the filter, and enter dimensions for the new object numerically.

All the Shapes filters are useful, but the free-form and wave filters are probably the best. The two wave filters (water and amplified waves) produce interesting distortion effects, and the free-form filter lets you warp objects using spline or Bézier controls. For example, you can manipulate the mesh to bend a flat object into a potato-chip–like shape.

Movable Objects

The Move extension provides Illustrator users with filters (Back-to-Front, Front-to-Back, Exchange, Move, and Object Coordinates) for positioning objects individually or in groups. For example, the Move filter lets you easily move an object forward or backward, one position at a time. With the Object Coordinates filter you can reposition and resize objects. Illustrator users will undoubtedly find these filters a great help when creating complex images with many objects.

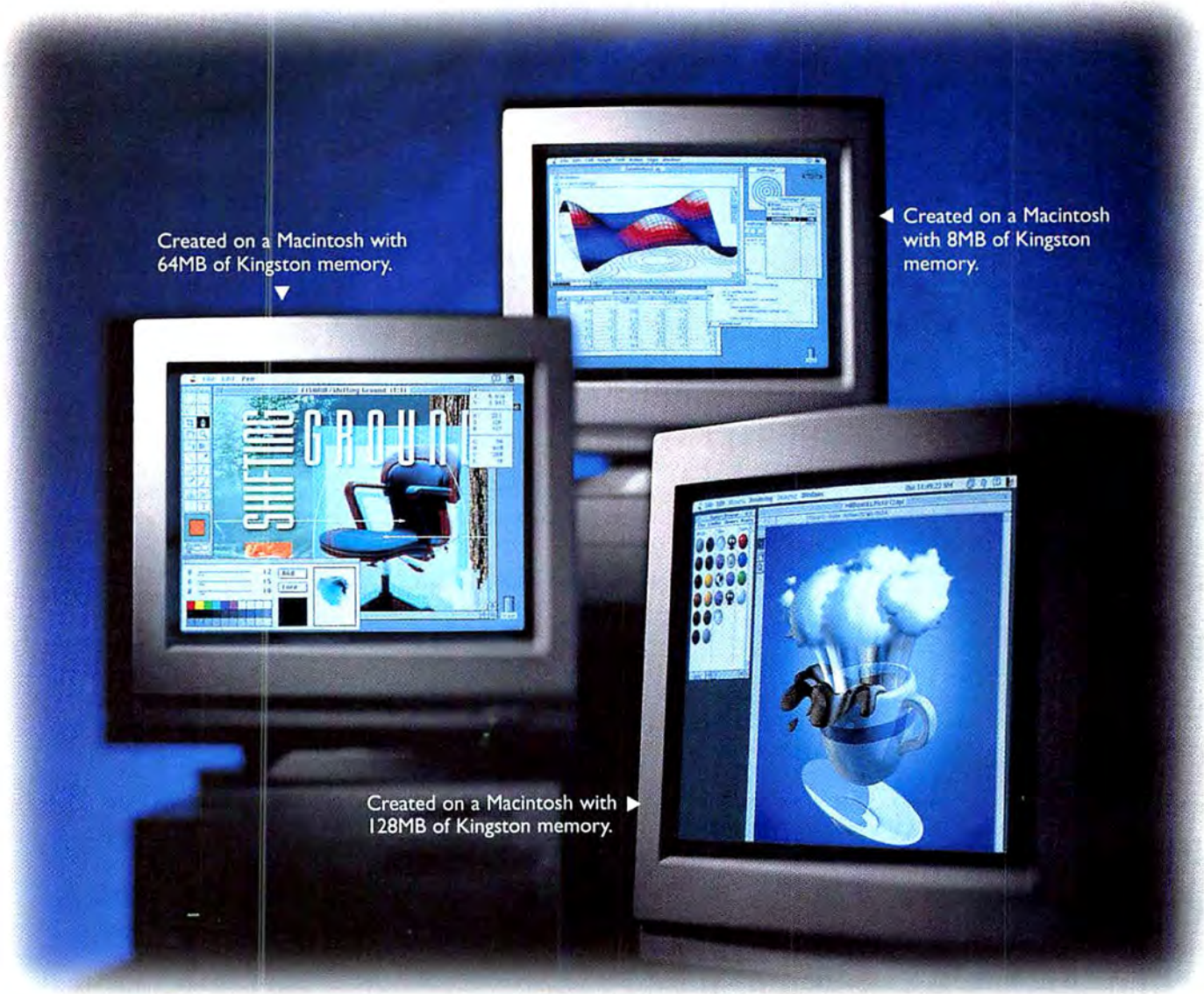
The manual provides basic guidance but is short on background. If you're unfamiliar with color theory and models, you'll have to look elsewhere.

The Last Word

DrawTools makes a fine addition to FreeHand and Illustrator, providing excellent color-management and useful object-manipulation filters. If you want more control over the illustration process, check out these extensions.

—CARLOS DOMINGO MARTINEZ

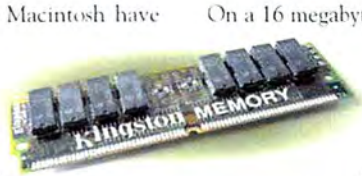
RATING: ★★★★/7.3 **PROS:** Excellent color-management and object-manipulation filters. **CONS:** Manual assumes prior knowledge of color theory. **COMPANY:** Extensis (503/274-2020; info@extensis.com). **LIST PRICE:** $149.



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QX-Tools 1.0

POWERFUL EXTENSIONS FOR QUARKXPRESS

YOU WON'T NEED—OR WANT—every one of the tools and treats in QX-Tools, a collection of ten XTensions for QuarkXPress 3.31 and later versions. But there's not a serious QuarkXPress user alive who won't find at least one or two of these tools irresistible.

Extensis (the company that created PageTools, a collection of add-ons for Adobe PageMaker) has assembled an impressive set of XTensions with features that are sure to appear on Quark users' wish lists. Granted, some of the tools are mere fluff; QX-Tips & Tricks, for example, does nothing more than give you a new tip each time you launch Quark. Most of the QX-Tools are quite powerful, however, either making Quark's existing features easier to use or providing entirely new capabilities.

Going beyond Quark

The best tools are those that add new features to Quark. For example, the QX-Layers palette lets you create layers within a document—very handy for producing complex layouts. You can move objects from layer to layer, reshuffle layers into any order by dragging them on the palette, and view and lock each layer independently. Likewise, the QX-Styles palette goes far beyond Quark's own style-sheet palette by allowing you to create character-level styles, something users have been wanting for a long time. The QX-Styles palette displays Quark's paragraph-based styles (replacing Quark's standard Style Sheets palette) along with any character-based style sheets you've added using QX-Styles. Once you've created character-based style sheets, you can group them into custom sets and access them from any Quark document.

One of the best add-ons is QX-Viewer, a cross between Quark's Document Layout palette and the standard thumbnail view. QX-Viewer displays each page or spread as a thumbnail. Rather than scrolling across a large spread, you can simply drag a marker across the thumbnail and be transported immediately to the corresponding location on the actual page. The palette also lets you jump from page to page using a pop-up menu and view a page at up to 940 percent magnification, far beyond Quark's standard 400 percent view.

Other XTensions are QX-Scaler, a powerful tool that lets you scale each component of a Quark object independently; QX-Dingbats, a palette that displays symbol characters in any font and allows you to insert characters by double-clicking on them; QX-Print, which provides enhanced printing options (such as printing nonconsecutive pages); and QX-Manager, a utility that lets you choose which XTensions load each time you launch QuarkXPress.

Customizable Tool Bars

One of the less successful but most prominently featured components is QX-Bars. This tool lets you create customizable tool bars—the kind you see in Microsoft Word or Excel—for one-click access to many of Quark's commands. The buttons are shortcuts to tasks that would otherwise involve pulling down a menu or typing numbers into a dialog box or Quark's Measurements palette. For example, you can increase or decrease kerning by 1/20 em by clicking on a button rather than typing numbers into a dialog box.



Improve Your Image The QX-Filters XTension supports basic image editing within QuarkXPress. Here, the masking feature was used to create gradient-filled text within a colored picture box.

The program comes with ten ready-to-use tool bars sporting buttons for the most popular Quark commands, but you can also create new buttons and assign commands to them. QX-Bars allows you to customize any palette or tool bar by adding or removing buttons and grouping them in any order you like.

The problem is that the resulting tool bars and palettes clutter the screen with tiny buttons that are hard to see. Many of the preconfigured buttons are labeled so cryptically it's hard to figure out what they do without pointing to them and reading the tiny help labels that appear. Experienced Quark users will probably feel that choosing commands from a matrix of small buttons is more work than using keyboard shortcuts and typing data directly into dialog boxes. Of course, if buttons and tool bars suit your working style, QX-Bars will boost your efficiency.

Image Editing

Another powerful tool, QX-Filters, lets you apply Adobe Photoshop–compatible filters (but *not* Photoshop filters themselves) to color and gray-scale TIFF and PICT images within Quark, provided your Mac has enough memory—applying a filter means increasing Quark's standard memory allocation by at least a megabyte or two. You can use the filters to create blurs and gradients and enhance images by changing brightness, contrast, and color balance. The most impressive component of QX-Filters is the masking feature, which lets you use a Quark object, such as a piece of text or a picture box, as a mask when applying a filter.

Overall, however, the QX-Filters are pretty limited. They work only on PICT and TIFF images—not Photo CD, EPS, or any other file formats supported by Quark—and are simply too slow to use on images larger than 3MB. Real image editing still requires a dedicated program like Photoshop.

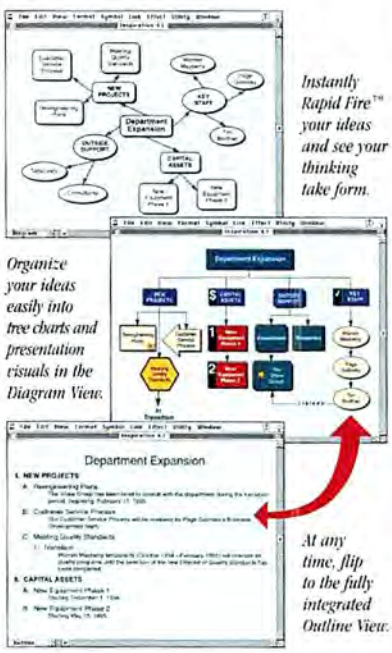
The Last Word

It's unlikely that you'll want to use every accessory in QX-Tools; in fact, deploying the full complement of palettes and tool bars would clutter your screen and slow you down. But even if you use only a handful of the tools in this package, you'll come out way ahead by working faster and more efficiently. It makes the world of QuarkXPress a much friendlier place to live.—JOSEPH SCHORR

RATING: ★★★★/7.2 **PROS:** Adds layering, improved navigation, and support for character-based style sheets to QuarkXPress. **CONS:** Image-editing filters can be applied only to small TIFF and PICT images; preponderance of tool bars and palettes can clutter small monitors. **COMPANY:** Extensis (503/274-2020, extensis@aol.com). **LIST PRICE:** $149.

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Macromedia FreeHand 5.5

DRAW PROGRAM OUTPERFORMS COMPETITOR, FOR NOW

LESS THAN A YEAR AFTER THE release of FreeHand 5, version 5.5 introduces several significant enhancements, including support for the Adobe Acrobat PDF format, the ability to export objects as antialiased images and to apply Adobe Photoshop filters to imported images, and the option to paste in-line graphics into text blocks (a first for a draw program). FreeHand 5.5 also includes over 10,000 T/Maker clip-art drawings and 500 URW type styles in both PostScript Type 1 and TrueType format, all of which were originally bundled with FreeHand 5.0 for Windows.



Photoshop Filters FreeHand 5.5 lets you apply third-party Photoshop-compatible filters (such as Gallery Effects, shown here) to imported images.

Given Photoshop's popularity among graphics professionals and casual artists, both FreeHand and rival Adobe Illustrator offer ways to support images and Photoshop-compatible filters. With Adobe in control of both Illustrator and Photoshop, FreeHand is at a marked disadvantage. In theory, you can apply an external Photoshop filter to any image placed inside a FreeHand document. In practice, third-party filters, such as KPT Convolver from MetaTools and the Gallery Effects plug-ins now carried by Adobe, work just fine, but many of the filters that ship with Photoshop 3.0.4, such as Spherize and Lens Flare, don't work at all, and almost none of the Photoshop 3.0.1 filters work. FreeHand 5.5's support for Photoshop's acquisition plug-ins fares better; I was able to import GIF, BMP, and Photo CD images.

FreeHand 5.5 also lets you rasterize selected objects as antialiased PICT images, which you can then modify inside an image editor and place into a presentation program or import back into FreeHand. You can change the number of colors in the image, specify the resolution, and even adjust the degree of antialiasing. You can also export the image to the Clipboard, if you have enough RAM. In my informal tests, FreeHand frequently rasterized drawings faster than Photoshop, but with FreeHand I encountered problems with insufficient RAM.

My biggest complaint with FreeHand 5.5 is its lack of essential printed documentation. To find out how to use the new features, you have to open a PDF file laid out into 61 horizontal pages designed to be read on screen. Worse, you must open the documentation in Acrobat; FreeHand can't read the encrypted PDF files. I don't have a problem with including supplemental material such as expert tips on disk, but burying fundamental information is a disservice to all users.

Version 5.5 ignores a few inadequacies that I hope to see addressed. The program needs to provide more flexible gradient and guideline functions, and the palette-laden interface remains as ungainly as ever. But the in-line graphics come as an unexpected pleasure. For example, you can now force a series of graphics to follow the contours of a curve, great for creating custom stroke patterns. Long-time FreeHand users will also appreciate a few minor revisions to text-handling and image-linking functions, as well as a new path operation that lets you crop a group of objects to a free-form path.

The Last Word

FreeHand 5.5 continues to outperform Illustrator 5.5, and the clip art and fonts alone are worth the $79 upgrade fee. Even so, there's plenty of room for Illustrator 6.0 to win back the number one position; whether Illustrator 6.0 will seize the day remains to be seen.—DEKE McCLELLAND

RATING: ★★★★/8.1 **PROS:** Includes clip art and fonts; quickly exports objects as PICT images; supports in-line graphics. **CONS:** Spotty support for Photoshop filters; no printed documentation of new features. **COMPANY:** Macromedia (415/252-2000). **LIST PRICE:** $595.

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HP CopyJet M

COLOR COPIER AND INK-JET PRINTER IS A MIXED BAG

USING INK-JET TECHNOLOGY, the HP CopyJetM combines a legal-size color copier with a 300-dpi PostScript Level 2 printer. The standard configuration includes 7MB of RAM (expandable to 39MB); 35 PostScript fonts (Mac) and 45 Intellifont and TrueType fonts (Windows); and a built-in JetDirect interface card with LocalTalk, 10BaseT, BNC, and parallel-port connectors.

The CopyJet M can autoswitch between platforms. While printing, you can start a copy job; when the print job finishes, copying begins. The unit contains a heater that dries the ink as it prints.

The CopyJet M prints color graphics at 300 dpi and text at 600 by 300 dpi. Using the Options portion of the Print dialog box, you can select any of three modes—Fast (a two-pass mode for black-and-white text), Normal (a two-pass interlaced mode), and Presentation (a four-pass interlaced mode)—as well as specify a halftoning algorithm. Also included are an online manual, PPD and PDF files for Adobe PageMaker and QuarkXPress, and the HP LaserJet Utility 3.0 (to rename the printer and download fonts or PostScript documents). The CopyJet M's front panel includes a Cancel Print Job button that instantly clears data from the printer's memory.

Print speed is similar to that of a 300-dpi laser printer. For example, the CopyJet M averaged three pages per minute when printing a multipage, black-and-white, Word text document in Fast mode.

Printed text is clear and crisp. The CopyJet M was optimized for printing business graphics. The quality of color output varies with the type of image and the program used. In Adobe Photoshop 3.0, color in RGB pictures is close to the original. CMYK images tend to come out dark (grays often fade to black and shadows disappear). DeltaGraph Pro charts print beautifully in QuickDraw mode, but have different colors and are darker when printed using PostScript.

CopyJet M's Copy functions are all on the front panel. They include paper type (plain, ink-jet, or glossy/transparency); lighter or darker; color controls (to adjust the red, green, and blue in the output, and to make the image paler or more vivid); and buttons to select black-and-white or color copies, emphasize lighter colors, print in high-quality mode, specify that the original is a photograph, set the zoom level between 50 and 400 percent, set the number of copies (1 to 99), and clear settings or cancel the current copy job.

Unlike making copies of black-and-white images, color copying is something of an art. To match the original colors you may have to fiddle with the controls and make several attempts before getting a solid match. Copying a letter-size color original can take between 1.2 and 4.5 minutes per copy, depending on the paper type and quality setting. Speed improves slightly when you print multiple copies.

Even when you use plain paper, color printing doesn't come cheap. A set of four ink cartridges retails for $135. Hewlett-Packard estimates that a set of cartridges



ROBERT PERRY

can print slightly more than half a ream of full-size color images at a cost of about 42 cents apiece. If you print smaller images or mix text and graphics, the cartridges last considerably longer.

The Last Word

The CopyJet M is a high-quality, speedy copier attached to a fast, medium-resolution color printer. If you frequently need color copies or are looking for a color printer for a small workgroup, the CopyJet M is a good investment.—STEVEN SCHWARTZ

RATING: ★★★/5.4 **PROS:** Less expensive than most color copiers; excellent copies and copy controls; can copy bulky materials; multiplatform printing; prints quickly. **CONS:** Lower resolution than most ink-jet printers; CMYK printouts are dark; no color-calibration software; paper tray holds only 180 sheets; expensive supplies. **COMPANY:** Hewlett-Packard (800/752-0900). **LIST PRICE:** $3649.

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MacWEEK July 10, 1995
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InfoWorld July 24, 1995
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Chagall 2.0.2

IMAGE-EDITING APP FLUNKS TEST

CHAGALL IS A POOR IMAGE EDITOR. The program's indecipherable interface, unreadable documentation, and badly implemented and even inoperable features are ingredients for disaster.

Although designed to be creative and distinctive, Chagall violates Mac interface standards without rhyme or reason. The program provides five toolboxes (called modules), none of which come up by default when you start the software. Few tools look like anything you've ever seen before, many tools are simply icons that bring up dialog boxes, and there's no tool-specific balloon help to aid in identification. To make things worse, some tools—including the text tool—and many options are forever dimmed. The unindexed, skimpy, and jargon-laden documentation ignores the dimmed functions; even the Read Me file ignores the inoperative text tool or CMYK options.



Filter Me Not You can filter a selected area in an image using nonintuitive icon options, but you can't filter a block; if a block is active, Chagall filters the image behind it and leaves the block unchanged.

Then there's the Undo command. Rather than nullifying the last operation, it undoes *every* operation performed since the last time you manually updated the Undo buffer. The closest thing to Redo is a Swap Undo Buffer With Image option that lets you swap the image on screen with the image in the Undo buffer.

In Chagall 2.0.1, the brushes were flat-out unusable, painting a series of disconnected circles. Version 2.0.2 remedies this bizarre oversight, but problems persist. Few brush tools bear any resemblance to their real-world counterparts, and most of the painting and editing tools are not antialiased, resulting in jagged lines. Though you can assign different colors to different brushes, you have to open two dialog boxes to access the brush color. You can leave the color palette on screen, however. Chagall displays a brush-size cursor when you hold a brush in place, but it switches to an arrow the moment you move your mouse.

Chagall's selection capabilities are worse. First, you can create rectangular selections only—there's nothing like a lasso tool—or paint masks from scratch using the brushes. To edit a selection, you first have to convert it to a floating selection, called a block. If you want to scale or rotate a block, you must do so numerically, and Chagall always transfers the block to a new image window. You can't scale or rotate a selection in place! Each image has its own Clipboard, so you can't copy and paste between images or paste an image copied from a different program. You can drag and drop blocks between images, but Chagall deletes the block from the original image. And you can't create a new selection outline without first deleting any active block.

Chagall has many other problems. If you create a new image, Chagall doesn't prompt you to save the untitled image when you close it. The filters are few and inflexible; you can't adjust the degree of sharpening or blurring, only how the filtered image mixes with the original. With the RAM partition set to 8MB—twice the recommended setting—and with 100MB of free hard disk space, I couldn't open more than three screen-size images. The vast majority of dialog boxes lack a Cancel button, and ⌘-period has no effect.

The Last Word

One day, Technosystems says, Chagall will have a text tool. A future version will include a lasso, color-correction options, CMYK output, and improved documentation with tutorials. That's nice, but right now it's version 2.0.2 that matters. Whatever the future holds, Chagall 2.0.2 ranks among the worst graphics programs available today.—DEKE MCCLELLAND

RATING: ★/1.5 **PROS:** None. **CONS:** Nonstandard interface; loads of inoperative functions; insufficient and abstruse documentation; botched Undo function; brushes and selection capabilities need work. **COMPANY:** Technosystems USA (502/351-0108). **LIST PRICE:** $299.

So you thought you'd save a little money on your memory.



Great idea. After all, memory upgrades can be a very costly addition to your system. And with the demands new software is placing on your Mac these days, virtually everyone who uses a Mac eventually buys more memory. One little detail is often overlooked. Many companies sell memory upgrades manufactured with DRAM that does not meet the correct industry standard voltage range for your system. The resulting voltage loss can cause you to lose valuable data. Sub-spec memory runs too slow to match the speed of newer, faster processors, causing timing errors that can corrupt your hard drive and even leave your system inoperable. So cheaper memory might cost less in the short run, but you get burned in the end. To avoid these problems check your system's manual for correct refresh rates, speed and voltage specs, and make sure you install memory that matches it. Or, easier yet, just buy Viking Components memory. It's the best.



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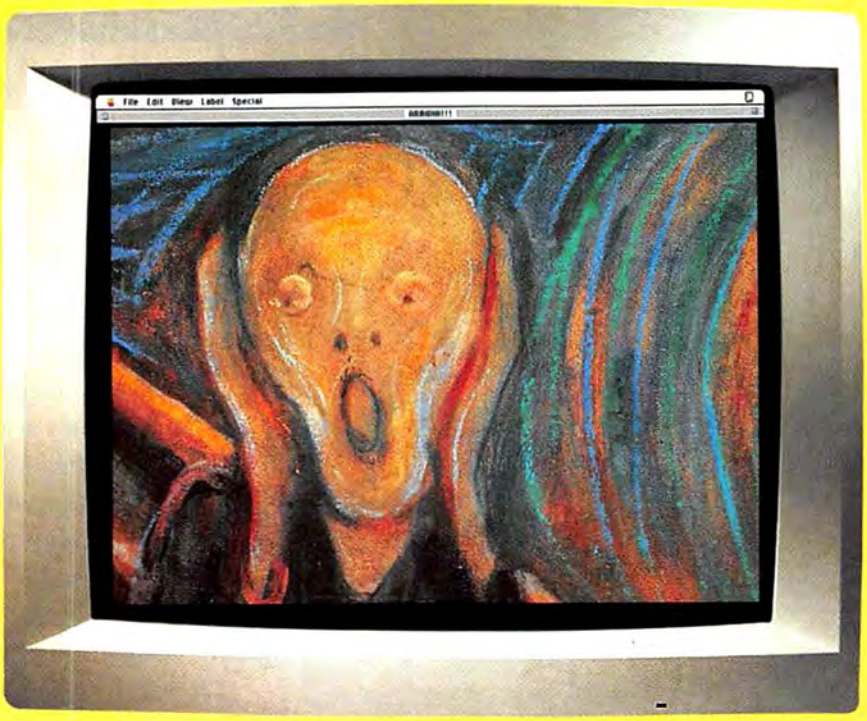
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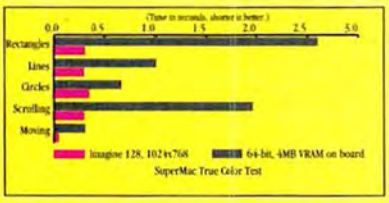
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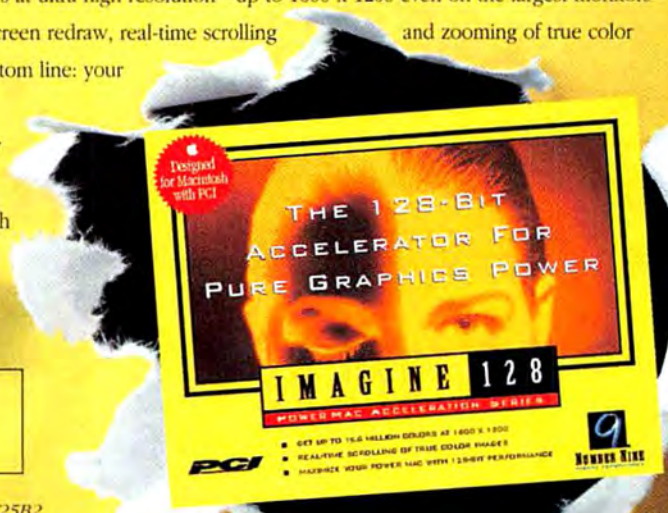
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At Ease 3.0

THIS DESKTOP ALTERNATIVE LETS YOU SHARE YOUR MAC AND WORRY LESS

JUST BECAUSE YOU SHARE YOUR computer doesn't mean you want to share everything that's on it. Nor do you want to worry that someone will trash key files. At Ease 3.0 helps you rest easier by letting you decide which files others can see and access. (A separate product called At Ease 3.0 for Workgroups is available for networked Macintoshes—see *Reviews*, November 1995.)

After installing At Ease, you use the At Ease Setup application to configure access privileges for up to 40 users. This setup application is password-protected, so other users cannot alter their access privileges. You can supply and refer to an optional clue for the At Ease Setup password, a feature that I'd like to see implemented for individual users' passwords, as well.

At Ease offers three levels of access to the Macintosh. The Regular Finder provides unrestricted access to everything on the computer's hard disk. An intermediate setting, Restricted Finder, looks like the traditional desktop, but confines users to specific files. In Restricted Finder, each user has two special folders: one contains aliases to all of the applications and documents that the user can open, while the other stores the user's personal documents. (Restricted Finder users can view the contents of other folders on the hard disk, but they can only launch programs or open documents to which they have been granted access.) At Ease Panels, which is ideal for novices, has a simplified file-divider interface that lets users see and launch only the applications, documents, or control panels for which they have been granted access privileges (see "Access Panels").

If you have a CD-ROM player, At Ease lets you restrict access to selected discs or even to specific files on a disc. Unfortunately, you can't customize sets of CD-ROMs for individual users. At Ease also provides access to shared volumes, as long as users have the correct access privileges or the volume's owner has enabled guest access. Another useful feature lets you set preferences for applications. For example, you can configure an application so that it can be launched by other programs, even if a user doesn't have access to that application.

At Ease offers three levels of menu access. Minimal Menus restricts the user to basic commands like Close, Restart, and Shut Down. Restricted Menus adds the Get Info and Find commands, and also lets the user access the Chooser. All Menus lets users choose any menu commands that don't conflict with other security restrictions that are in effect. Unfortunately, there's no way to create custom menus for individual users.

In day-to-day use, At Ease is unobtrusive and well behaved. I especially appreciate the ability to switch from one user to another (along with their different access rights) without restarting, a welcome feature on Macs with long boot times. At Ease does have a few relatively minor limitations, however. Apple claims that At Ease lets you tailor your Mac for users of all ages, but the sign-on screen requires some reading skills, so it might not be suitable for toddlers. (Very young children may find Launch Pad from Berkeley Systems more appealing—see *Reviews*, January 1995.) And for power users, there is no way to control which extensions load at start-up.



Access Panels In At Ease Panels users see only the files they're allowed to access.

The Last Word

At Ease offers a good way for many home, office, and education users to share their Macs without sacrificing peace of mind.

—FRANKLIN TESSLER

RATING: ★★★/6.2 **PROS:** Simple setup; can switch between users without restarting. **CONS:** May not be suitable for very young children; no way to customize extension sets. **COMPANY:** Claris (408/727-8227). **COMPANY'S ESTIMATED PRICE:** $46.

StatView 4.5

STATISTICS AND GRAPHING PACKAGE

TEN YEARS AGO, STATVIEW WAS A statistical smash hit as StatView 512, and it's still a Mac best-seller, with particular strengths in both the college market and in clinical and biochemical research. Version 4.5 incorporates about a year of user feedback and programming refinement, keeping StatView a top choice for most purposes.

This version is larger than past ones (maybe it should be called StatView 9MB instead of StatView 4.5), due to some notable inclusions: the formerly independent Quality Control and Survival Analysis programs. These previously cost $295 and $195, respectively, so StatView 4.5 represents a considerable step-up in value.

Some longtime features have been made much more usable in this release. For example, StatView has always let you apply criteria to data sets—for example, "exclude from the heart-attack data set all records where weight is greater than 300 pounds." Now you can preview criteria definitions in the Edit/Apply Criteria dialog box; a Criteria pop-up menu at the top of each data set lets you apply, remove, and redefine criteria; and analysis reports specify which criteria were applied to your data set during an analysis. If you do lots of data filtering with criteria, this last feature is crucial. StatView's ability to manipulate criteria more conveniently encourages you to apply the Random criterion (it randomly samples the data set) so you can try some quick- and-dirty analyses of large data sets by testing much smaller subsets.

StatView 4.5 also offers new data-management functions (for text, multiple-column formatting, date/time, and variable manipulation) and improved menus (the huge Analyze menu is at last hierarchical). There's also a raft of new analysis templates, including one that performs Bartlett's test for homogeneity of group variances followed by Welch's version of one-way ANOVA.

Other usability improvements include a gigantic (600K) implementation of Apple Guide that effectively replaces the manuals, and amounts to on-the-fly step-by-step tutorials for specific procedures. StatView Guide is not just a rehash of manual sections—someone at

continues

Abacus clearly thought through the optimal pedagogical use of a Guide system.

In statistics the essence of usability is speed; the program takes longer to start up, but importing tabbed text files is much quicker than in earlier versions, and calculation using formulas is 2 to 5 times faster. Abacus also has a new manual describing formula use and optimization.

I have a few quibbles. StatView does not import multisheet Microsoft Excel 5 workbooks. It also lacks MacSpin, Abacus's classic 3-D rotating scatterplot program—a major omission, since most of



Cool Maps Some other statistics programs can create map scattergrams like this one, but StatView's presentation output is still the best in the business.

StatView's competitors offer this important facility. But it's hard to see how rotating 3-D plots could meet StatView's high standard for graphical output. StatView has always provided the highest-quality, most easily modified hard-copy graphs (see "Cool Maps"), and so far no one has figured out how to make 3-D rotating plots look good except as an animation.

The Last Word

StatView 4.5 could be characterized as the best program for people who get paid to present statistical results to audiences. Its core set of statistics is sufficient for all but the most advanced academic practice, and it offers excellent control over statistical presentation graphics. StatView has been a perennial Mac statistics best-seller because it's easy to use and packs lots of features at its core; 4.5 is easier still and offers significant additions.—CHARLES SEITER

RATING: ★★★★/8.3 **PROS:** Quality control and survival stats; improved help with Apple Guide. **CONS:** Doesn't handle Excel 5 notebooks; no 3-D scatterplots. **COMPANY:** Abacus Concepts (510/540-1949). **LIST PRICE:** $595.

SPSS 6.1

MAINFRAME STATISTICS GIANT HAS NEW MAC INTERFACE

LARGE ORGANIZATIONS THAT DEpend on statistics—and that means most of them—have settled on a handful of vendors for heavy-duty statistics software. The Mac vendors in this elite set are SAS Institute and SPSS. Until recently, using SPSS's offering was a bit strange—you had the sensation that the Mac was acting as a dumb terminal for its own CPU, with a command language rooted in the computing practices of the 1960s. With version 6.1, that's changed. SPSS is a real Mac product now, even though you can still peek behind the curtains and see the command language running in its own window.

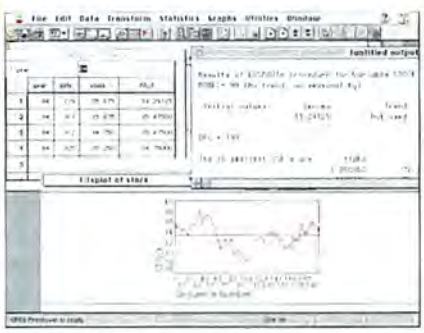
Most statistical products for the Mac (Abacus Software's StatView, DataDesk, and SAS's JMP are good examples) arrive as a single package. SPSS, in contrast, offers a base package and a long list of modules geared toward statistical specialties. If you purchase the modules separately, the entire set costs more than $2000; fortunately, SPSS offers discount bundles. As a result of this pricing policy, the full SPSS installation—which positively cries out to be on CD-ROM—ships in a huge array of separate boxes with their own disk packs and manuals.

My main complaint about SPSS—though it is the most complete statistical system available—is that all sorts of standard tests that you would expect to find in the base package appear in separately priced modules. The Advanced Statistics module, for example, includes nonlinear regression and logistic regression—tests that every other vendor offers as standard operating equipment. Similarly, two components that most vendors would put in the base package—factor analysis and discriminant analysis—are part of the Professional Statistics module.

I have no complaints, however, about the modules' performance, features, and documentation. Marisa J. Norušis has produced the clearest, most readable and example-packed manuals ever seen in the field of statistics. For each module, the documentation presents detailed sets of case studies that take you step-by-step through the module's tests; other programs' documentation frequently lists just the tests. The Categories, Tables, and Trends modules are the most complete Mac packages available for categorical analysis, cross-tab studies, and time-series analysis, respectively. Although the modular approach makes assembling a full range of tests an expensive proposition, because statistics professionals tend to work in specialized areas, the SPSS approach *can* be cost-effective. A forecaster buying the base product and the Trends module, for example, would have the best system available for time-series work at a reasonable price.

File size in SPSS appears limited only by virtual memory space; test files containing several hundred thousand records presented no problem in any of the modules. Performance optimization for the Power Mac was thorough as well, with most standard tests executing three to six times faster on a 6100/60 than on a Quadra 800 running the 680X0 version.

SPSS's size makes virtual memory a must on systems with 16MB of RAM or



Smooth(ing) Operator SPSS's time-series module, Trends, can perform exponential smoothing on a 1000-point time series.

less. Computational performance takes only a slight hit under virtual memory, but screen handling becomes painfully slow. Be sure to tack an order for more RAM onto your SPSS purchase order.

The Last Word

SPSS is serious professional-statistics software, with the most-complete test suites, the best documentation—and the highest price.—CHARLES SEITER

RATING: ★★★★/7.1 **PROS:** Robust, full-strength package; fast Power Mac version handles huge data sets easily. **CONS:** Full implementation is expensive. **COMPANY:** SPSS (312/329-2400, sales@spss.com). **LIST PRICE:** $695; modules $395 to $495.

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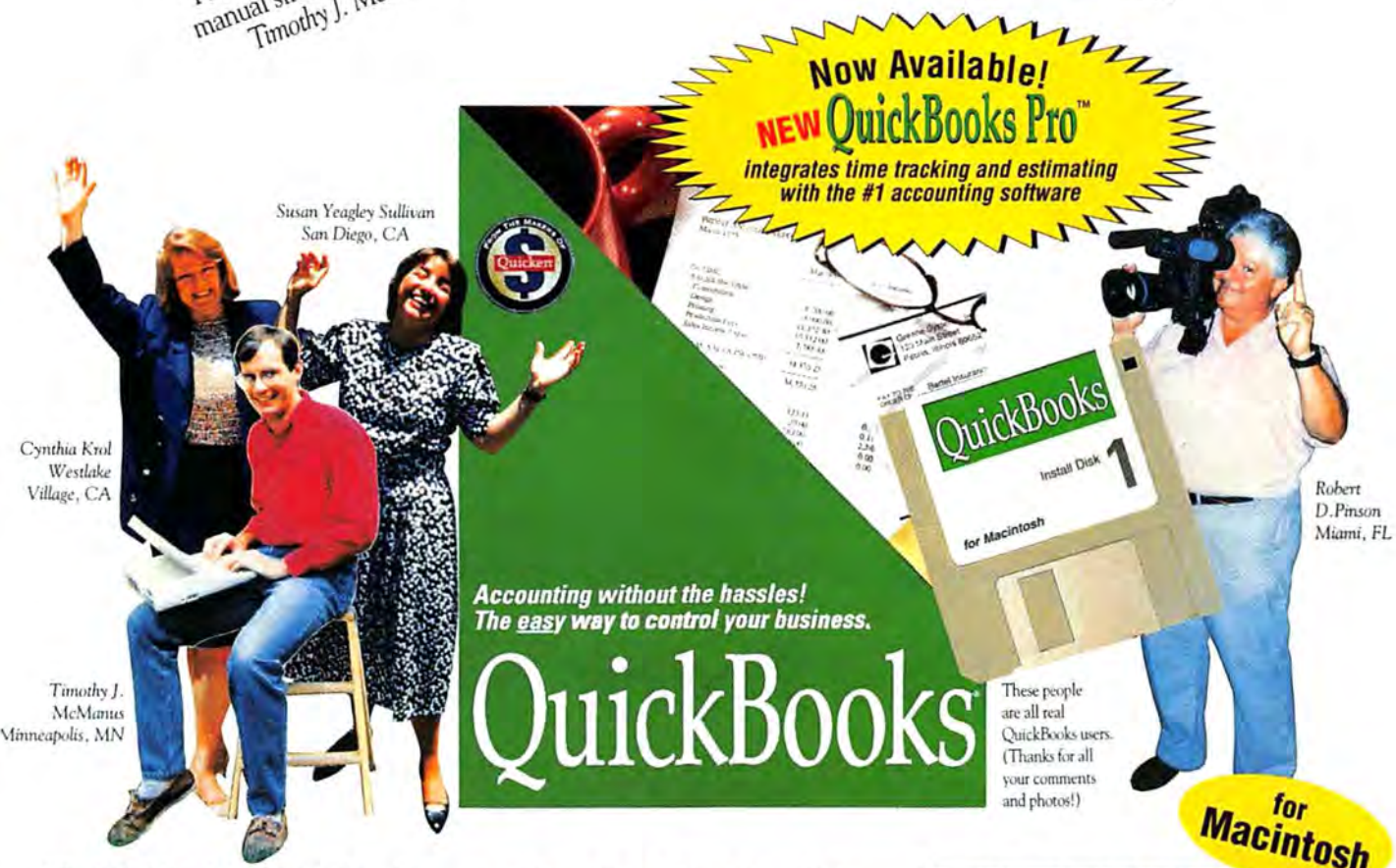
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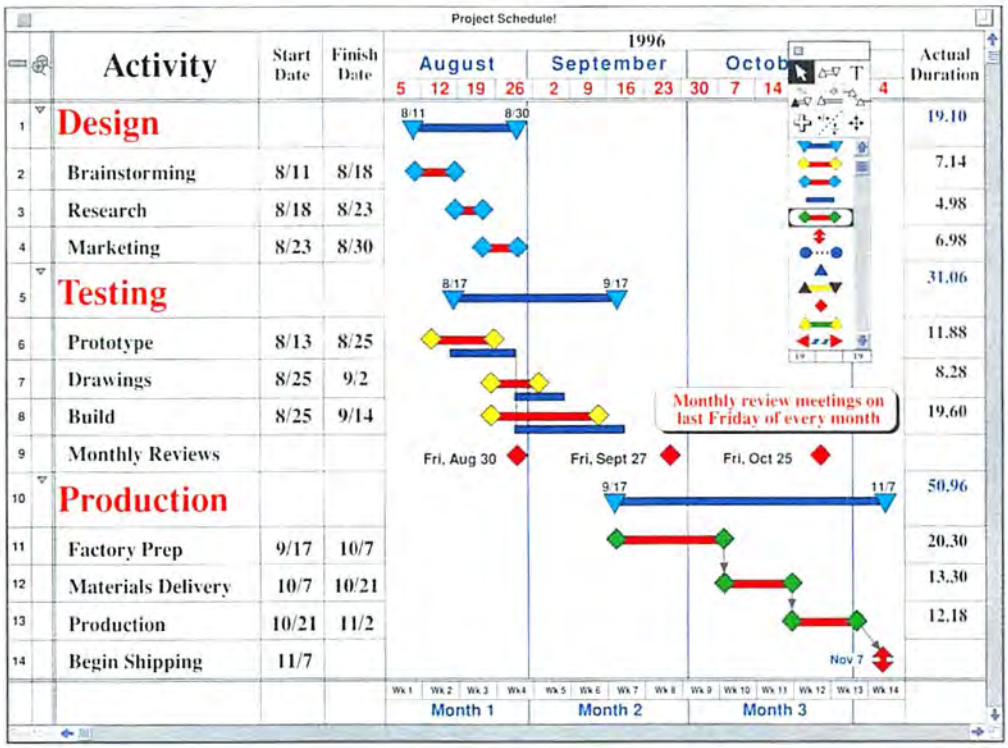
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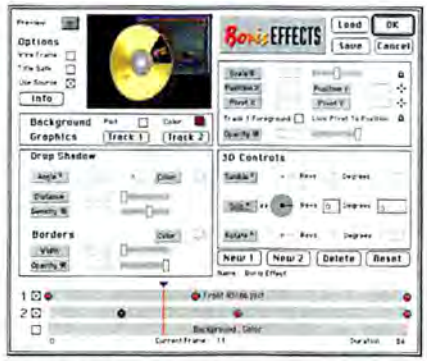
Boris Effects 1.01

PLUG-IN FOR PREMIERE AND MEDIA 100 ADDS VIDEO-EFFECTS CONTROL

TIRED OF THE LIMITED VIDEO-effects options in Adobe Premiere and Data Translation's Media 100? Artel Software's Boris Effects 1.01 is a straightforward plug-in that gives digital-video addicts the precision and control they have been looking for.

Boris Effects (BFX) can create innumerable 3-D video effects based on up to two video clips, or *channels*. It's a software-only version of the expensive digital video effects (DVE) hardware systems developed for analog video in the '70s and '80s. The program consolidates into one manageable interface many of the single-channel controls for motion, scaling, and opacity scattered throughout Premiere and Media 100.

BFX ships with 25 loadable preset effects that you can customize (you can also build an effect from scratch and save it to a library). From Premiere, you access the program's interface by double-clicking on a BFX transition in the Transition window and choosing the custom options in the standard Premiere dialog box. Access from Media 100 is similar.



Personal Effects Boris Effects generates digital-video effects complete with intraframe interpolation, matte manipulation, and multiple keyframes.

The two video channels are represented by tracks that support up to 20 keyframes each. Keyframes control the *x*, *y*, and *z* positions as well as opacity, image borders, and drop shadows. Linear interpolation between keyframes is the default, but you can apply acceleration and deceleration options to give motion paths a bit more finesse.

BFX runs on Power Macs and FPU-equipped 680X0 machines. On my Power Mac 8100/100, BFX seemed to use a special snail-render technology: the results were smooth, but a 40-frame transition with a drop shadow and some *x*, *y*, and *z* movement, compressed at 640-by-480-pixel resolution, took more than 20 minutes to render (14 minutes in draft mode). Fortunately, an instant-preview window gives you enough visual feedback to design your effect accurately. Those looking for the power of Adobe After Effects in a plug-in will be disappointed, however; BFX can't handle advanced procedures like fracturing the video image.

The Last Word Until third-party hardware support or a faster processor is available, Boris Effects won't tempt you to sell your real-time Pinnacle 3D system. Still, it fills a basic video-graphics need with power to spare. For Media 100 users, given the absence of some of Premiere's single-channel DVE options, BFX is an absolute must. Its custom controls help users break away from the ho-hum look of DVE transitions and will keep at least a few viewers from tuning out.—AVI HOFFER

RATING: ★★★/6.9 **PROS:** Keyframe control of transitions; good preview system. **CONS:** Lengthy render times; limited alpha-channel support; unsophisticated keyframing. **COMPANY:** Artel Software (617/566-0870, byamnitsky@aol.com). **LIST PRICE:** Premiere version $350; Media 100 version $695.

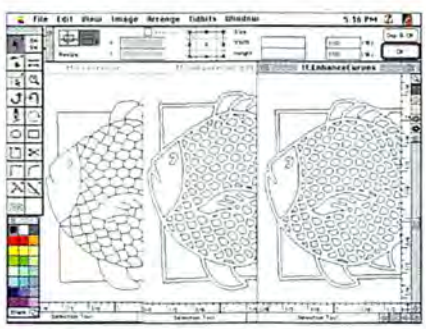
Tracer 1.0

ACCURATE BUT EXPENSIVE AUTOTRACING

TRACER, A UTILITY FOR CONVERTING black-and-white bitmapped graphics into line art that you can edit in draw programs, produces excellent, accurate tracings. Unfortunately, it's not priced like a utility. Even at an introductory price of $495 ($795 list), Tracer costs more than the illustration programs where you use its output files.

Tracer lets you scan images directly or import them as PICT and TIFF files. Two tracing modes build outlines around the solid areas of an image—one is optimized to reproduce curves; the other emphasizes fewer points and creates sharper corners. A third mode calculates the center lines of solid areas and draws the line there.

With the EnhanceCorners and Centerline modes, you can alter settings to achieve the most accurate image translation. In EnhanceCorners mode, you can set the degree to which Tracer filters extraneous pixels from the outline. In Centerline mode, you can specify a threshold line-weight value, and the program traces along the center of areas thinner than that value but outlines areas that are thicker.



Trace Elements Tracer provides three autotracing modes (shown here at standard settings).

Tracer provides tools for cleaning up a tracing—for example, sharpening or rounding off corners. Line, arc, and Bézier tools let you replace jagged lines with straight edges and sweeping curves. Tracer's tools work straightforwardly, but they're more like drafting tools than illustration tools. And they don't always behave in Mac-like fashion. For example, to draw Bézier curves, you place anchors along an existing curve, then manipulate nonstandard control points to define the curve. Plus, to complete all tool operations, you must select a button on the tool palette. It's not hard, just different.

Actually, Tracer doesn't simply draw, it evaluates the geometry of the outline shapes and changes the underlying object database, just the way a drafting program does. This technique stems from Tracer's origin as a CAD/CAM tool for the sign-making industry. Tracer supports EPS and Illustrator output formats, as well as DXF and HPGL (Hewlett-Packard Graphics Language).

Tracer requires an ADB hardware-protection key. Too many devices can overload the ADB, so if you use other key-protected programs, you may be reduced to swapping keys in and out of the ADB bus.

The manual is short, hard to read, and poorly organized. Explanations are often unclear and lack depth. Until you get accustomed to what happens when you alter tracing parameters, expect to experiment.

The Last Word Tracer provides excellent autotracing tools, but it's expensive. When draw programs like Macromedia FreeHand provide built-in (albeit less controllable) autotracing routines, and Tracer's more direct competitor, Adobe Streamline (415/961-4400), costs $199, it's hard to justify the expense.—CARLOS DOMINGO MARTINEZ

RATING: ★★★/5.0 **PROS:** Excellent conversion of bitmapped images to vector graphics. **CONS:** ADB hardware protection; high price. **COMPANY:** ScanVec (508/694-9488, tracerinfo@scanvec.com). **LIST PRICE:** $795.

SCSI PowerPlug II

A FAST WAY TO SWAP SCSI DEVICES



GIBSON

SCSI POWERPLUG II SPEEDS UP swapping SCSI devices such as disk drives, scanners, and CD-ROMs by letting you plug and unplug them while your Mac and connected drives are powered on. (Usually you have to shut everything down before you switch SCSI devices; failure to do so can result in crashed drives and lost data.)

You plug the PowerPlug, which resembles a large SCSI terminator block with an LED light and a switch, into the end of the SCSI chain. You then plug an empty SCSI cable (not supplied) into the PowerPlug and put a rubber cap (included) over the cable's empty plug.

A control panel activates the device-swapping process (and gently guides you through it). The control panel can also be used to mount removable media, such as SyQuest or Bernoulli disks.

The actual process of hot swapping SCSI devices is awkward, but it works. First you slide a two-position switch on the PowerPlug to Data Stop. Then you open the PowerPlug II control panel, select the SCSI identification number of the device you want to connect, and click on the Add Device button.

Next you remove the protective cap, plug the SCSI device you want to swap into the SCSI cable, and slide the PowerPlug switch to Data Go. Within seconds, the newly installed device should mount on your desktop.

To remove a SCSI device, you slide the switch to Data Stop, click on the Remove Device button in the PowerPlug II control panel, then turn off and disconnect the device.

Some scanners and CD-ROMs require a system extension to mount, so you may have to restart your Macintosh, negating the time you would have saved by hot swapping. Also, for the process to work properly, you must exactly follow Hot Wire Technology's clearly written procedures for removing or adding a device (or risk a crash or lost data).

The product worked as advertised, and I didn't encounter any system problems. However, the rubber cap was at best a flimsy solution to closing the SCSI plug. Mine tore apart the first time I used it (fortunately, I had a second unit from which to grab a new one). Also, you need to buy a separate unit for each computer, which can add up.

The Last Word SCSI PowerPlug II might be useful in an environment where people need to move SCSI devices around frequently, such as a graphic arts studio or a service bureau with fewer removable drives than workstations. However, if you don't have to constantly swap SCSI devices like drives and scanners, you might find that the old-fashioned method of shutting down, connecting, and restarting works just fine.

—GENE STEINBERG

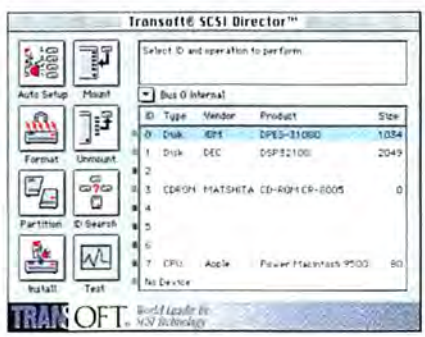
RATING: ★★★/5.1 **PROS:** Relatively quick hot swapping of SCSI devices. **CONS:** Awkward drive removal and installation process; need to buy a separate unit for each computer; flimsy cap for SCSI cable. **COMPANY:** Hot Wire Technology (formerly Adcon; 203/761-0651, andrewp@hotswap.com). **LIST PRICE:** $119.99.

SCSI Director Pro 4.0

FAST, RELIABLE HARD DISK FORMATTING AND TESTING UTILITY

TRANSOFT'S SCSI DIRECTOR PRO packs an extensive feature set into a single disk-formatting program. Besides performing routine hard disk formatting and testing, it supports CD-ROM drives and removable devices. Advanced features include support for RAID Level 1 mirroring (data is written simultaneously to two drives or drive partitions to allow real-time backups), the ability to create multiple A/UX 3.0 partitions, and tools that let you customize your drive-formatting settings. Transoft has added a feature called Data-Guard, which prevents system freezes, disk drive damage, and data loss if you accidentally unplug a drive while your Mac is running. SCSI Director Pro also installs in native form on a Power Macintosh, although the program doesn't support native SCSI device drivers.

My favorite feature lets you mount removable drives without installing any special software, such as a system extension or SCSI chain-probing program. You simply insert the removable media after booting your Mac, and seconds later it's mounted.



Fast Disk Setups You can activate a function simply by clicking on its icon in the setup window.

Version 4.0 also offers a new, easy-access interface with clearly labeled buttons for the most important functions. Basic disk-formatting chores are a snap with the Auto Setup function, which creates a single Mac partition. You can also create up to 99 SCSI partitions by clicking on the Partition button. A Test function puts your drives through a series of diagnostic tests and displays a graphical view of a drive's read-write performance and disk-access speed.

When I reviewed the previous release of SCSI Director Pro (see *Reviews*, September 1994), I ran into problems getting it to work properly on my Power Mac. Transoft has addressed those shortcomings; I updated and formatted drives attached to my 9500/120, and the program performed precisely as advertised.

I am less enamored of the company's customer support. If you need help, even right after you've installed the program, you have to dial a 900 number that costs $1.95 per minute. No support is offered on the major online services, either—a single AppleLink E-mail address is your only resource. The manual could also use some improvement. Basic disk-formatting chores are clearly spelled out (and a useful Help menu is available), but some of the advanced features need more detailed coverage.

The Last Word Despite my quibbles with Transoft's support policies and the need for a better manual, the latest release of SCSI Director Pro offers good value and superlative performance. It may be all the disk-formatting software you ever need.

—GENE STEINBERG

RATING: ★★★★/8.4 **PROS:** Fast formatting; speedy, reliable drive performance; removable devices mount without System extensions. **CONS:** Expensive telephone support; advanced features are not explained well in manual. **COMPANY:** Transoft (805/897-3350, awrench@transnet.net). **LIST PRICE:** $99.95.

The meeting's in an hour, the charts are in Windows, and you can't find the sticky with the client's address.



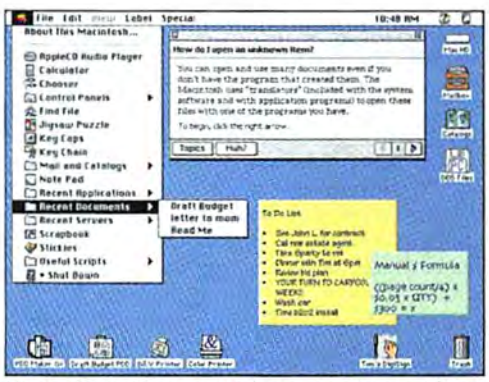
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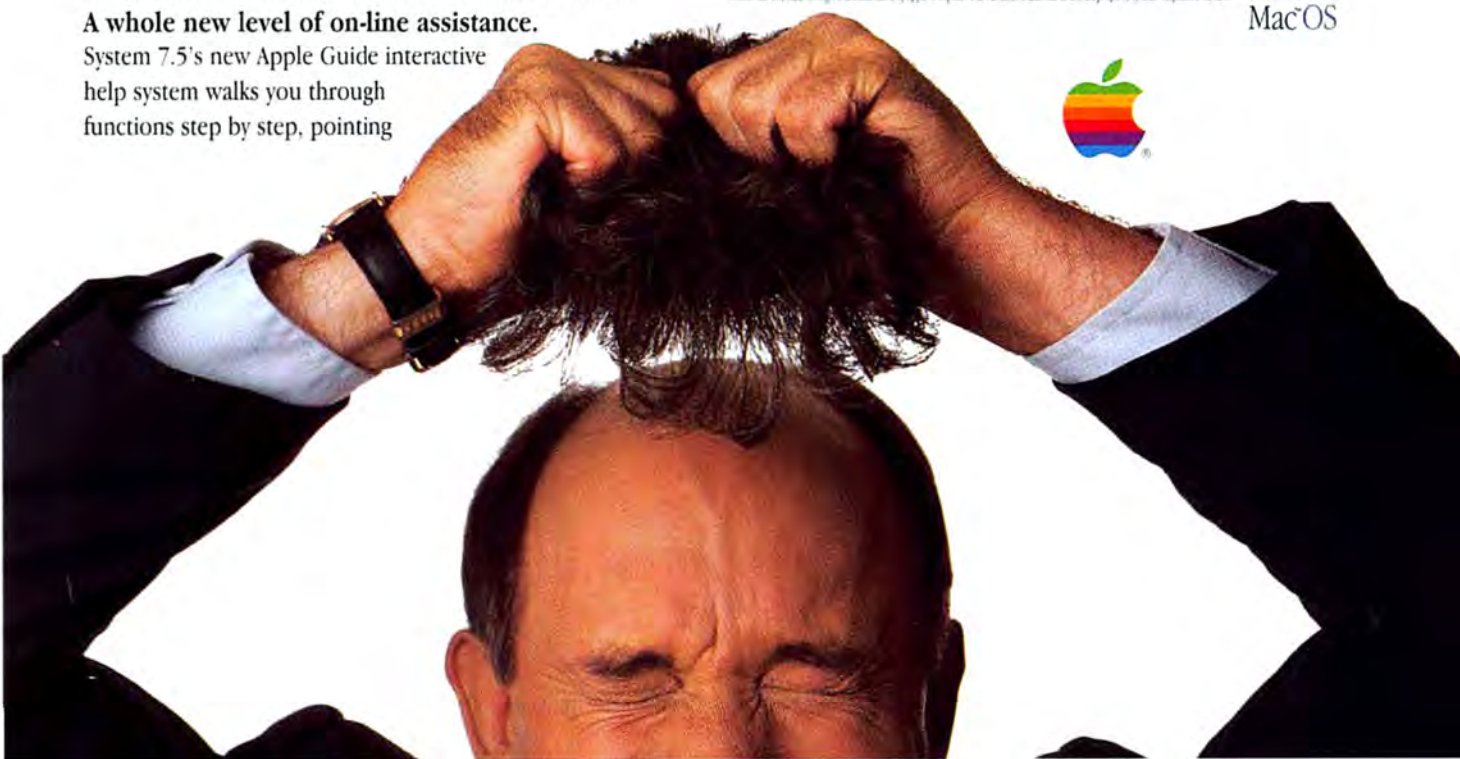


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Mac OS



Quicken Family Lawyer 6.0b

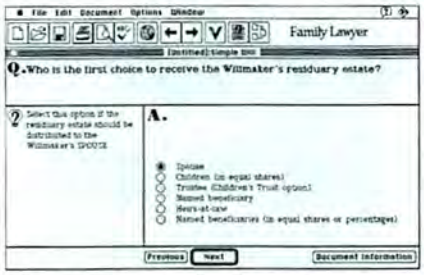
HELPS YOU PREPARE 61 LEGAL DOCUMENTS

QUICKEN FINANCIAL SOFTWARE solved a problem in my household caused, ironically, by computers themselves. Proliferating ATMs made managing a joint checkbook too hard for our manual method of monthly balancing. Quicken Family Lawyer, in contrast, aims to solve a problem caused by more traditional factors: a growing family, aging parents, accumulating assets, and complex negotiations with strangers.

Quicken Family Lawyer 6.0b is a collection of 61 legal documents, organized into nine categories (estate planning, family/personal, powers of attorney, health/medical, consumer credit, real estate, financial, corporate, and employment). Included are a living will and a last will and testament, plus various forms for dealing with creditors; buying, selling, or renting property; and negotiating employment.

If you don't know where to start, the Document Suggestions feature will ask you a series of questions, then give you a list of documents you might find useful. Unfortunately, double-clicking on the document names does not lead you directly into the documents. This problem recurs throughout Family Lawyer. For example, the online help is understandable and easy to use, allowing you to search by keyword or category. Once you find the form you want, however, you can't double-click on its name to begin filling it out. Instead, you must return to the home screen and select New Document or open a new document from the File menu.

Once you've chosen a form, the program interviews you and constructs a document incorporating your answers. Alternatively, you can fill in the blanks to complete the forms. When you're done, Family Lawyer verifies that it has all the necessary information to make the document legally binding.



Taking Care of the Family Quicken Family Lawyer leads you through a series of questions, then creates a legal document that incorporates your answers. The button on the lower right displays information on the legal terms in your document.

The Last Word Quicken Family Lawyer has many useful tools, helpful explanations (online, not in the cursory 22-page manual), and enough legal advice to get you through each document. Its wide selection, however, comes at the cost of depth. If you're interested in estate planning, for example, Nolo Press's WillMaker 5.0 (which has a 200-page manual and lets you create a will with 100 bequests, compared with Quicken's 16) might be a better tool.

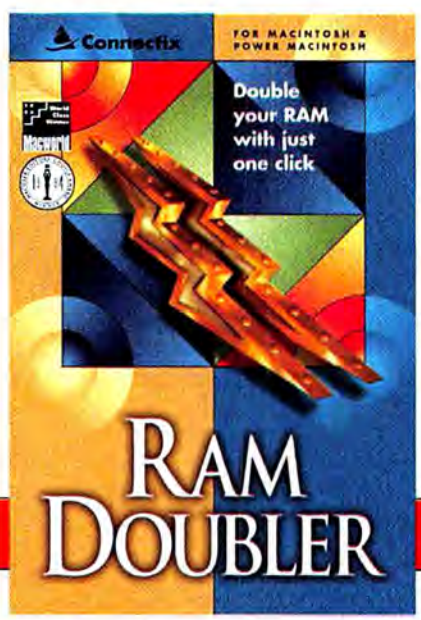
Still, if you're like most people—racing toward the inevitable with no legal documentation in hand—Quicken Family Lawyer offers an affordable, functional way to cover the basics.—LIZA WEIMAN HANKS

RATING: ★★★/6.9 **PROS:** Creates useful legal documents; clear online help; provides state-specific information; offers both interview and fill-in-the-blank options. **CONS:** Manual is cursory; hypertext linking is superficial; legal information is adequate but not comprehensive. **COMPANY:** Parsons Technology (319/395-9626). **LIST PRICE:** $49.

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System Requirements: Macintosh equipped with a 68030, 68040 or PowerPC microprocessor. System 6.05 or later, including all versions of system 7 • 4 MBs required (hard disk required for machines with 4 to 6 MBs) • Not compatible with Mac SE, original Mac Classic, original Mac LC or PowerBook 100 or Mac II without a 68851 PMMU or any accelerator that does not work with virtual memory.

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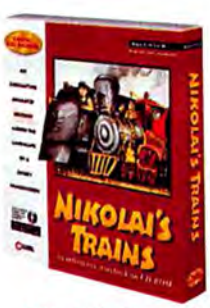
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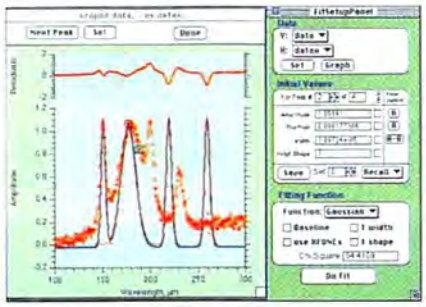
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Igor Pro 2.0.4

TOP-NOTCH SCIENTIFIC GRAPHING

THE LAST TEN YEARS HAVE SEEN AN explosion in 3-D color computer graphics. Most scientific journals, however, still publish on plain old two-dimensional paper and in black and white. In addition, computers make analysis of scientific data almost instantaneous, at least after you've determined and programmed the appropriate analysis. Of all the software available for graphing, Igor Pro is the best for the working environment of scientists and engineers.

Igor Pro's approach is unique, from data input to processing to output. Inputs are all assumed to be Igor *waves*, which means time-dependent data of the kind routed to your hard drive from analog-to-digital conversion hardware. For analyzing this data, Igor offers every standard functional capability you'll need, plus an automation capability, via a C-like Igor language, for running several kinds of analysis on one set of data and then repeating the procedure on related files. Finally, Igor Pro provides the most tunable 2-D charting available for the Mac; besides overlays and flexible scaling, it provides more control over markers and tick marks than other charting programs. Most offer acceptable controls for making full-page charts—Igor Pro excels at the detailed controls needed to make a chart that's readable in the formats required by scientific and engineering publications. Waves, tables of data, charts, and program fragments can be saved as Igor Pro experiments, so that all relevant parts of a project can be called up with a single command.



Peak Performance Igor Pro's slick, interactive method for analyzing peaks in experimental data allows you to curve-fit standard mathematical peak shapes to experimental peaks singly or in groups.

Besides offering programmability for functions and analyses, version 2.0.4 lets you customize menus, so you can turn Igor Pro into an easy-to-use analysis system. The XOP tool kit ($150), which works with version 2.0.4, lets you integrate previously written C code into Igor operations. And Igor Pro is now two to three times faster than the previous version on large data sets.

WaveMetrics doesn't think Igor Pro is difficult to use. If you are a scientist with some training in programming and a math background that includes a course in special functions of mathematical physics, the company is right. If your programming experience is limited to whacking out a few pie charts in Microsoft Excel, Igor Pro is probably over your head. Customer support is mostly via E-mail and is oriented toward excellent answers to difficult technical and programming questions, not hand-holding for beginners. If you aren't interested in high-end uses, you might find DeltaGraph Pro or KaleidaGraph more congenial.

The Last Word Igor Pro is the best Mac professional program for 2-D scientific data handling. It has a huge assortment of built-in capabilities and includes a simple programming language for developing more kinds of analysis and for batch processing of data files.—CHARLES SEITER

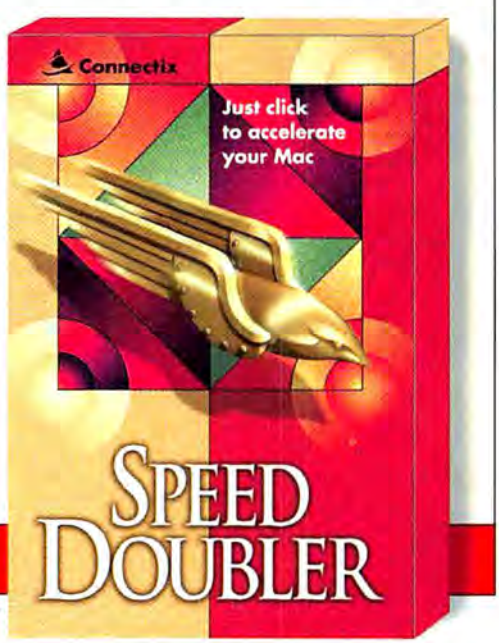
RATING: ★★★★/7.5 **PROS:** Complete; powerful; publication-aware charts. **CONS:** Demands commitment. **COMPANY:** WaveMetrics (503/620-3001). **LIST PRICE:** $495.

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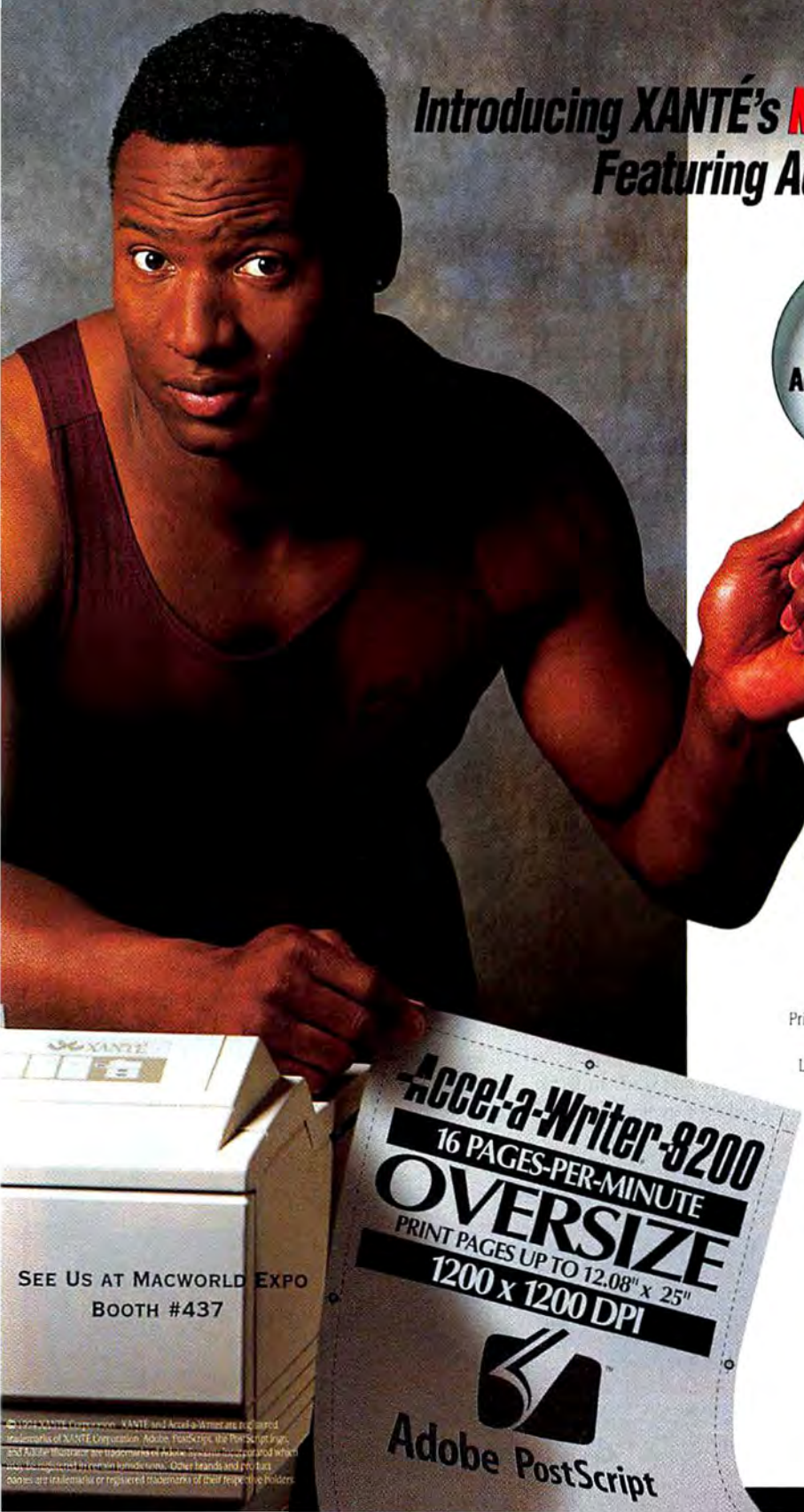
Requirements: Macintosh computer with a PowerPC 601/80 or 68040 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100

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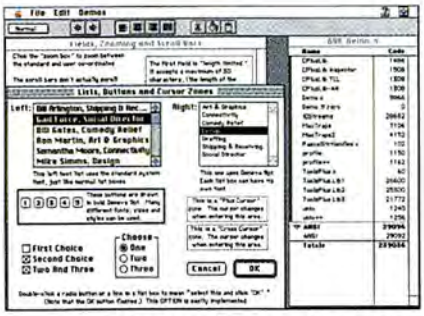
Tools Plus 2.6

PROGRAMMERS' TOOL KIT SAVES TIME

ONCE YOU BEGIN PROGRAMMING for the Mac, you immediately notice the vast number of lines of code it takes to produce anything resembling a usable application. You are rapidly motivated to find a way to acquire, rather than write, standard pieces of code—there's no reason to program your own routines for window handling or menu management, once you know how they work.

Ideally, you hope some diligent developers have produced a set of routines that cover the most-used interface features. That's basically the description of Tools Plus. For example, since most of the Edit menu items are standard from one application to the next, Tools Plus gives you an Edit menu package. (By the way, the Edit menu facility in Tools Plus contains code for making the Undo item change—Undo Typing, Undo Cut, and so forth—depending on the user's last editing action. Writing your own code for a fully capable Undo is tedious and error-prone. And end users are unforgiving about Undo problems.)

Similarly, from sheer fatigue or lack of time, programmers might skip such nifty interface touches as pop-up menus, specific system-error messages, ⌘-*key* equivalents, or floating tool palettes in an application. With Tools Plus, you can invoke any of these elements with a few lines of code, rather than pages of code. The Tools Plus manual offers plenty of expert advice on implementing the routines in Tools Plus, and the routines are more compact and faster than anything you might write.



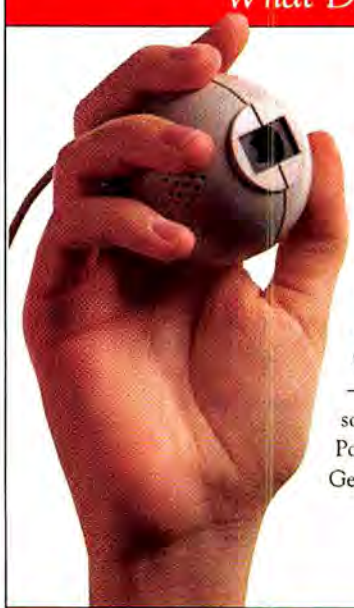
Ease of Use Tools Plus offers most of the interface elements you need for a real Mac app (application windows at left; project window at right).

I tested Tools Plus with Think Pascal (an astonishing number of loyal programmers still use it), Think C, Symantec Think C++ versions 7 and 8, and Metrowerks CodeWarrior C (both 680X0 and Power Mac versions) 5 and 6. I found a pronounced and annoying tendency for Tools Plus to exhibit little installation problems as I moved from older compilers to the latest releases. This isn't really the company's fault—it stems from Symantec's and Metrowerks' occasionally renaming files or relocating folders—but it means you can spend time puzzling out installation details without much help from the manual. Water's Edge also expects you to get most of your technical support by E-mail, and since it's a small company, it doesn't really have the staff to explain Mac basics or compiler-specific details. Water's Edge has announced a visual app-builder for late 1995, which might be a more suitable product than Tools Plus for programming neophytes.

The Last Word If you intend to distribute your app as shareware only, you'll need all the help you can get. Every element of Tools Plus is useful, and you'll find Tools Plus is a bargain compared with coding these routines yourself.—CHARLES SEITER

RATING: ★★★★/7.0 **PROS:** Excellent routines. **CONS:** Some installation glitches. **COMPANY:** Water's Edge Software (416/219-5628). **LIST PRICE:** For Symantec's C/C++ and Pascal $149 each; for both $199; for CodeWarrior Bronze $199; for CodeWarrior Gold $249.

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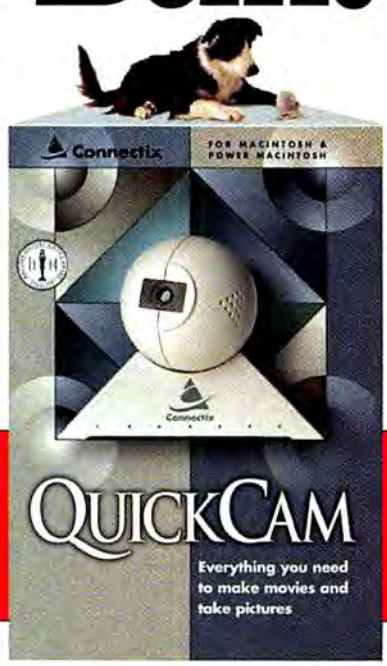
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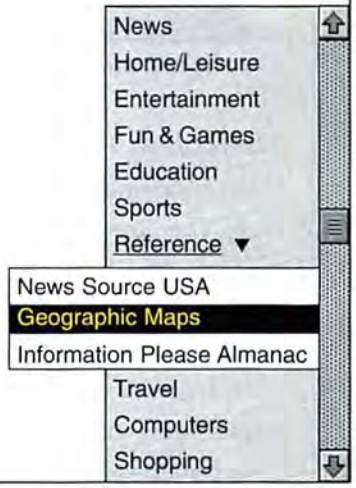


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LS FORTRAN 1.1

FORTRAN RIDES AGAIN, THIS TIME ON THE POWER MAC

FORTRAN IS STILL THE LANGUAGE OF choice in broad areas of engineering and scientific computing—even in such modern fields as parallel computing and aerospace design. Compilers like LS FORTRAN from Fortner Research (formerly Language Systems) are used to run not just legacy code, but new programs in structural engineering and quantum chemistry as well.

FORTRAN customers tend to be concentrated near large government labs and contractors, implying that a key task for a Mac FORTRAN compiler is to allow VAX, Cray, and other big-iron FORTRAN code to run on a Mac desktop. Mac users at such sites report that, using LS FORTRAN AppMaker (a rapid-development utility from Fortner) and LS FORTRAN, they can port FORTRAN programs to the Mac and give them a respectable graphical, menu-driven Mac interface in only a few days. LS FORTRAN puts the Macintosh Programmer's Workshop (MPW) Shell to good use as a large-program development environment, making it easy to stitch together code from a variety of sources and debug and modify each piece as you prepare it for porting (see "Convenience Plus"). The MPW Shell, an Examples library, and Adobe Acrobat Reader are included on the LS-FORTRAN CD-ROM.



Convenience Plus MPW-based menus allow quick assembly of FORTRAN code from scratch in Fortner's LS FORTRAN.

To test it, I took a modest (10,000-line) VAX FORTRAN program—saved as an ASCII text file to some 400K Mac disks in 1987!—and in one afternoon got it running at dazzling Power Mac speed, albeit with a barebones interface. A good MPW programmer probably could have done the same in an hour. LS FORTRAN lets you create a working, modern program from old code with minimal effort, saving hundreds of hours of work that went into the original coding.

The Mac FORTRAN market consists of Fortner Research, Absoft, and a handful of specialty vendors. Fortner fans claim an edge in customer support, exception handling, and reliability, while Absoft customers claim optimization advantages. Fortner includes a good source-level debugger in LS FORTRAN but sells its complete Debugging Toolkit as a separate product; Absoft bundles the excellent multilanguage Fx debugger with its development tool kit. For the relatively small number of FORTRAN 90 adopters, Absoft is readying an F90 package. Absoft also includes the most graphing support, but that may change; Fortner has acquired the superb Spyglass Plot (and the 3-D visualization aids Dicer and Format) from Spyglass, now primarily a Mosaic vendor.

The Last Word LS FORTRAN is an excellent compiler that places careful emphasis on compatibility with code written for mainframes and supercomputers.

—CHARLES SEITER

RATING: ★★★★/8.0 **PROS:** Compatibility with existing FORTRANs; efficient MPW implementation. **CONS:** Complete debugger sold separately. **COMPANY:** Fortner Research (703/478-0181, fortner@cais.com). **LIST PRICE:** $695.

SCANVEC

Tracer

"Tracer's results are amazing. In fact, you'll be a little stunned when you first see Tracer's output."

– MacWEEK Review 10/30/95

ScanVec's Tracer™ software is a quick, affordable solution for automatically converting bitmap artwork into ready-to-use line art.

Built for Macintosh and accelerated for Power Macintosh, Tracer automatically traces the outline and/or centerline of any black and white scanned or imported bitmap image. The graphic is precisely reproduced into vector-based line art. No clean up necessary! Tracer's ready-to-use line art can be immediately brought into any graphics or layout program. Powerful, yet easy-to-use editing tools are also available for manipulating the converted line art.

Mac OS

Accelerated for Power Macintosh

SCANVEC
The Graphics Specialists

155 West Street, Wilmington, MA 01887
Tel: 508-694-9488 • 800-866-6227
Fax: 508-694-9482
800-766-6644 (24hr Fax Info)
e.mail: usasales@scanvec.com

It's as easy as...
1 - 2 - 3



1. Scan or import any bitmap image



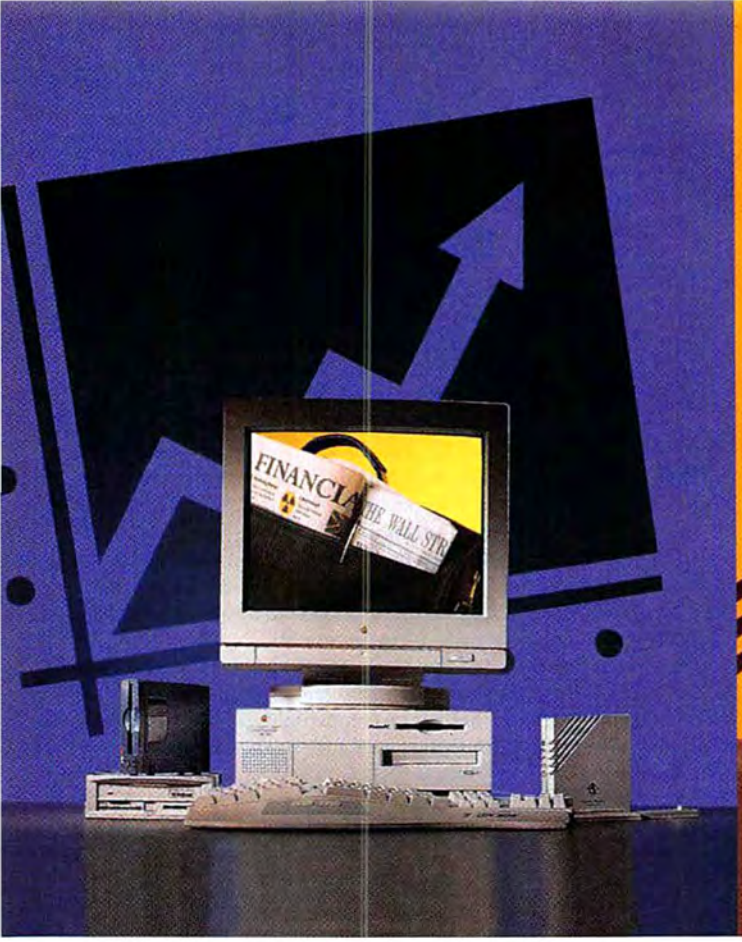
2. Vectorize into line art

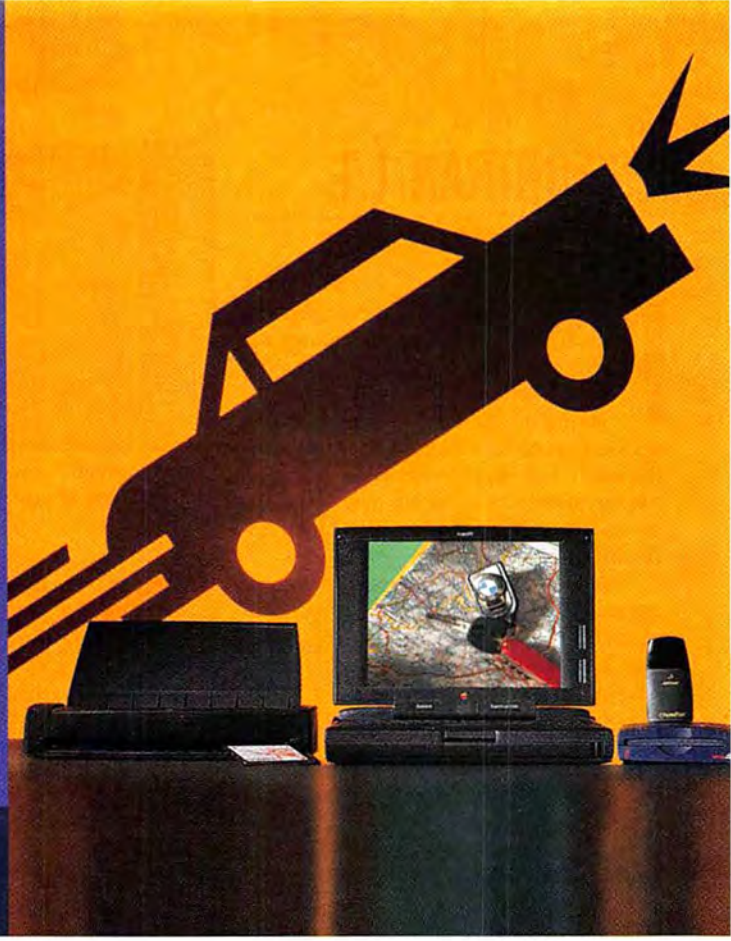


3. Export ready-to-use vectored line art

It's quick, easy and extremely accurate

SEE US AT MACWORLD EXPO BOOTH #449 **Circle 75 on reader service card**

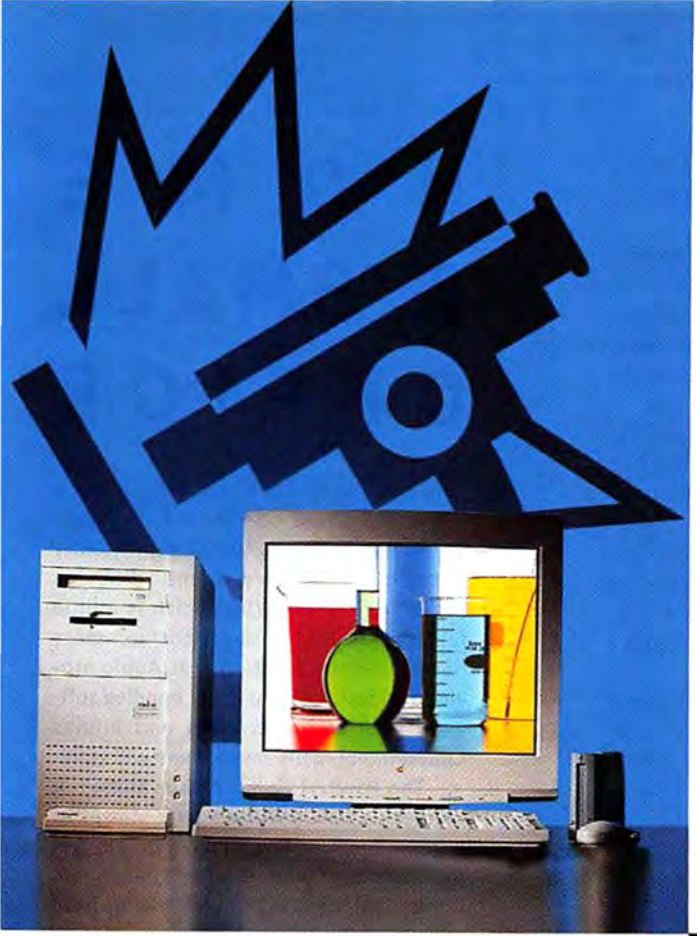




THE BEST MAC FOR







MACWORLD LAB CHOOSES THE IDEAL SYSTEMS FOR SIX KEY TYPES OF WORK

THE JOB

BY GALEN GRUMAN

Choices, choices. It's the promise of the clone era—a range of Mac systems from Apple, Radius, Power Computing, and DayStar Digital that when coupled with the right peripherals will let you get the complete Mac system that's perfect for your needs. No more limited offerings from a single Mac systems maker. ✦ Of course, choices make life harder. We may have resented Apple's we-know-best attitude and the resulting limited range of system options in years past, but at least it made the decision easier: a Mac IIci or a IIsi, an SE or a Mac II, a Plus or a Plus. Now, Apple has more than a dozen models, many of which are available in several configurations: the Power Mac 7200, 7500, 8500, and 9500 series; the Performa 5200, 5300, 6100, and 6200 series (and their LC equivalents for schools); and the PowerBook 190, 2300, and 5300 series. Power Computing has several variants of its NuBus-based Power line, as well as the new PowerWave line of PCI and PCI/NuBus Macs. Radius has two main lines: the 81/110 line for general usage and the System line for graphics and multimedia authoring. And DayStar offers one line, the four-CPU Genesis MP for high-end image editing.



PHOTOGRAPHY BY PAUL FRANZ-MOORE

While the range of choices is nowhere near what a PC buyer expects—thanks to Apple's limited licensing and de facto control over clone makers' designs (see "Why Apple Can't Meet Demand," *Macworld*, January 1996)—it's still a lot, especially when you consider the third-party options.

If you're looking for a new system for yourself, your company, a loved one, or a friend, you could spend days wading through product literature and Web sites' marketing materials. Or you could read on and save all that time and effort. We've picked the optimal system for each industry category. Sure, you can cut some corners to save money, but here's what

MW LAB

we recommend you shoot for. Why limit yourself up front if you can afford to get the best? After all, the way software goes, your Mac can never be too fast or have too much capacity.

What's in a System? *Macworld* pored over the many Mac systems available and selected the top contenders for the major usage scenarios: Business and Professional, Home and Small Office, Graphics and Publishing, Media Authoring, Science and Engineering, and Road Warrior. We then put the contenders head-to-head in both our Macworld Lab real-world composite benchmarks and application-specific benchmarks.

A Mac system is more than a Mac—you need a different set of peripherals and configurations for different kinds of work. We determined the configuration needed for each type of use and tested that configuration, so you'll know what you really need.

When you put together a system, there are three sets of considerations: what the Mac comes with, what you need to add to bring performance up to par (such as RAM or a cache card) or to be functional (such as a keyboard), and what add-ons you need to customize the system for your specific needs. We spell out all three in the following pages.

When we have specific recommendations for brands of peripherals, we tell you; otherwise, any good-quality product of that type (rated three stars or higher in *Macworld*'s Star Ratings system) will do. *Macworld*'s product features and reviews tell you which those good products are; just look at any issue's *Star Ratings* section or do a search via Macworld Online (http://www.macworld.com).

In many cases, you'll spend more on peripherals than on the Mac itself. But chances are that you already own some of those peripherals, so be sure to factor out their cost when pricing your ideal setup.

Keep in mind that all prices listed are estimated street prices, which fluctuate based on where you live and where you shop. As a rule of thumb, add 10 to 15 percent to these prices if you shop at a local dealer (who often provides services that a superstore or mail-order firm can't match) or outside a major metropolitan region.

WHY LIMIT YOURSELF UP FRONT IF YOU CAN AFFORD TO GET THE BEST?

Also keep in mind that we don't include the price of software, since software needs can differ greatly among people doing similar work.

Tests That Reflect Your World

After configuring them for the jobs they're meant to do, *Macworld* put these top contenders through their paces in Macworld Lab. Macworld Lab doesn't rely on automated tests like some publications. Macworld Lab used hands-on testing with the key programs that you use, based on tasks that you do, which best show these systems' performance in the real world—your world. The results of this intensive testing appear in the benchmark "How Each Mac Stacks Up."

And Macworld Lab went even further. It developed special hands-on, real-world test suites for the six key usage scenarios, so you'll know which Mac system is optimized for your work. We report those results in the following pages.

Should You Buy Used? Although Mac prices have dropped greatly in the last three years—a powerful Power Mac 7500/100 sells for what an anemic Centris 610 did three years ago—it's often tempting to get a used Mac to save a little more money for peripherals, whose costs quickly add up.

Used systems are worth a look, but we recommend you stick with Power Mac 6100, 7100, and 8100 systems, since the next major revision to

CONTINUES ON PAGE 109

HOME & SMALL OFFICE

Surprise! The best Mac for home use is a low-cost business-oriented system, Power Computing's Power 100. It significantly outperforms Apple's home offerings (including the 7200/90, which is a little faster than the less-expensive, more home-oriented 7200/75 that Apple provided for testing), plus it has bundled software such as ClarisWorks and Intuit's Quicken that many home users will want.

The Power 100 has NuBus slots, not the new PCI slots in the Power Mac 7200 nor the TV-tuner slot in the Performa, but the chances of your needing to add cards is remote (how many of your friends have cards in their home Macs?), and a computer should be a computer, not a television. MPEG cards are also a waste, since there are so far no games or titles for them.

Power Computing recently introduced new PowerWave PCI Mac clones for business users, so expect the Power 100 (and 120) to be phased out. It's safe to expect that Power Computing will have low-cost configurations of its new PowerWave line.

We recommend a PowerPC CPU as the heart of your system. Keep in mind that a 603, which is used in the Performas, is only about 75 percent the speed of a 601 running at the same megahertz rate, and half the speed of a same-megahertz 604. You'll want at least 8MB of RAM, a 500MB hard drive, a 256K cache card, an extended keyboard, and a quad-speed CD-ROM drive. The Power 100 comes with all of these. The price in the Basic System column at right includes any of these features that the Mac system vendor offers; otherwise the feature's cost is in the System Essentials column.

For peripherals, a 15-inch monitor is fine, since you can run it at 17-inch resolution. You'll also want a 28.8-Kbps fax modem, a 720-dpi color ink-jet printer, and a removable drive. The total cost of these add-ons is listed in the Essential Peripherals column. For details on the best peripherals for the Power 100, see the descriptions at right.





MONITOR

It may be that 17-inch monitors are all the rage, but for the home we recommend you get a 15-inch monitor that displays a large image area (such as those from NEC Technologies), which lets you see a 17-inch monitor's worth of information for half the price of the real thing.



PRINTER

Unless you do high-volume printing, you can get a color ink-jet printer from Epson, Hewlett-Packard, Canon, or Apple for about $500. If you need a monochrome laser printer, the $1200 Apple LaserWriter Select 360 is an excellent choice.

FAX MODEM

You might be tempted to save a few bucks on the modem by getting a 14.4-Kbps version, but don't. If you will spend



any time at all downloading files from online services or cruising the Web, you'll want the performance of a 28.8-Kbps modem. They're not that expensive—most are about $250, and cheaper models are starting to appear, such as Supra's compact $180 Supra Express 288 modem. Otherwise, consider the GVC-Maxtech XM288E, Global Village TelePort Platinum, or U.S. Robotics Mac & Fax Sportster 28.8.

REMOVABLE STORAGE

Removable storage may seem like overkill for home use, but you are sure to like the ability to archive projects and move them to and from work or school. You'll want an Iomega Zip



($200) or SyQuest EZ135 ($240) drive. Home users will probably prefer the Zip's easier disk insertion and removal.

RAM

Make sure you get at least 8MB with your Mac system—System 7.5 and today's business programs demand it. If you can spare another $375, get an 8MB SIMM to bolster your RAM to 16MB. Luckily, the Power 100 comes with 16MB standard. You'll want a



256K cache card, which is standard equipment on the Power 100.

HOW THE COMPLETE SYSTEM PERFORMS

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Apple Power Mac 7200/75	2.5	2.0	7.2	1.5
Apple Performa 5215CD	2.0	1.5	6.8	1.3

All results are shown as times as fast as a Centris 650 (Centris 650 = 1.0).

WHAT A HOME AND SMALL-OFFICE SYSTEM REALLY COSTS

System	Star Rating	Total Price	Basic System	System Essentials	Essential Peripherals	Phone
Apple Performa 5125CD	★★★/5.6	$3000	$2300	all included	$700	408/996-1010
Apple Power Mac 7200/75	★★★/6.5	$3100	$1600	$100 (keyboard)	$1400	408/996-1010
Editors' Choice Power Computing Power 100	★★★★/7.1	$3100	$1699	all included	$1400	512/258-1350





MONITOR

Whether you're doing layout or image editing, you want a big screen so you can see the full picture at actual size. Since most companies have phased out 19-inch monitors, you'll likely end up buying a 20- or 21-inch model. Expect to spend about $2000. Good choices include NEC Technologies' MultiSync XE21 and NSA/Hitachi's RasterOps SuperScan Mc 21 (see *Buyers' Tools*, "Full-Size Color Displays," elsewhere in this issue).

VIDEO-DISPLAY CARD

To drive that big monitor at 24-bit color depth, you need an accelerated video-display card. A good one costs about $700, and several companies sell them. If you are doing intensive image editing, get Radius's $1700 ThunderColor 30/1152,



which includes Photoshop and CMYK-to-RGB acceleration.

PRINTER

For color proofing, you will need a more accurate dye-sublimation printer, rather than a thermal-wax printer. A professional-level color printer is not cheap—they start at about $5000. Good choices



include the 3M Rainbow 2720 or the Fargo Pictura 310. You may need access to a monochrome laser printer for layout proofs (dye-sublimation printouts are not cheap, either); a good 600-dpi business laser printer costs about $2300.

REMOVABLE STORAGE

If you will be doing graphics or publishing,



you probably will work with service bureaus and clients, and you are going to need a way to transport those huge project files. The industry standard in publishing for removable media is a SyQuest drive, which costs about $500. SyQuest drives come in different, incompatible capacities, so be sure that you get the capacity that will work for you and your business partners.

FAX MODEM

A 28.8-Kbps fax modem is what you will want for sending faxes, for perusing online services, and for visiting World Wide Web sites to download the latest software updates and cool utilities. Fax modems are cheap (about $250) and come in all shapes and sizes. In a recent *Macworld* evaluation, the GVC-Max-



tech XM288E, Global Village TelePort Platinum, and U.S. Robotics Mac & Fax Sportster 28.8 all did well. You could use ISDN modems to transfer files (assuming your clients and service bureaus have ISDN connections); ISDN modems cost $500 to $700.

INTERNAL STORAGE

You willl want at least 2GB. If your system has



less than that, you should add a second internal drive—1GB drives cost about $300, and 4GB drives now cost just $1000.

SCANNER

Whether for FPOs or for actual use in your layouts or images, you will want a flatbed color scanner. Good choices include the Epson ES-1200C, the Hewlett-





GRAPHICS & PUBLISHING

A decade ago, Apple made graphics and publishing a reality on the desktop, spawning a new industry and transforming an old one. It's fitting, then, that the best choice for a graphics and publishing workhorse remains an Apple Mac. The Power Mac 8500/120 offers a bit faster performance, a better case design for adding components, and a PCI-based system for a price less than or equivalent to that of its top contender, Radius's NuBus-based System 100, which comes with add-on hardware.

For image editors, Radius adds some great Photoshop-acceleration hardware, but you can buy the equivalent Radius ThunderColor PCI for use in your Apple Mac, getting the best of both companies' products. If you do just illustration or layout, this hardware is wasted money.

We recommend a 100MHz or faster CPU, preferably a 604. You'll want 32MB of RAM (72MB if you are an image editor), at least a 2GB hard drive, a 256K cache card, 10BaseT Ethernet, an extended keyboard, and a quad-speed CD-ROM drive. The Power Mac 8500 comes with all these but a keyboard, and you'll have to buy more RAM (from a company like Newer Technology) to supplement the 16MB included in the 8500. The price in the Basic System column below includes any of these features that the Mac system vendor offers; otherwise the feature's cost is in the System Essentials column.

For peripherals, a 20- or 21-inch monitor is a must, as is an accelerated video-display card. You'll also want a 28.8-Kbps fax modem, a high-quality dye-sub printer for proofing, a removable drive, and a graphics tablet for input. Heavy-duty image editors will also want a Photoshop accelerator. The total cost of these add-ons is listed in the Essential Peripherals column. For details on the best peripherals for the Power Mac 8500/120, see the descriptions at left.

Packard ScanJet 4c, the Umax Technologies PowerLook, and the Agfa Arcus II.



GRAPHICS TABLET

Illustrators find that a tablet is easier to use than a mouse or trackball for fine movements. Good tablets, like the DrawingSlate II from CalComp and the ArtZ from Wacom, cost about $400.

KEYBOARD

Although your primary task is drawing, you are still going to need a keyboard for those essential shortcuts and the occasional invoice.



You can expect to pay between $70 and $100 for an extended keyboard, but you should avoid Apple's overpriced model.

RAM

Make sure that you get at least 32MB with your Macintosh system—System 7.5 and today's



graphics and publishing programs demand this much. Serious Photoshop users need 72MB. RAM will cost you about $700 in 16MB increments.

HOW THE COMPLETE SYSTEM PERFORMS

	Overall Score	Image Edit	Blurs	Sharpens	Stylizers
Apple Power Mac 8500/120	3.9	3.3	5.0	3.6	1.7
Radius System 100	2.9	2.8	6.0	5.1	2.8

All results are shown as times as fast as a Power Mac 8500 (Power Mac 8500 = 1.0).

WHAT A GRAPHICS-AND-PUBLISHING SYSTEM REALLY COSTS

System	Star Rating	Total Price	Basic System	System Essentials	Essential Peripherals	Phone
IMAGE EDITING						
Editors' Choice						
Apple Power Mac 8500/120	★★★★/7.7	$18,350	$4200	$2700 (RAM, keyboard)	$11,450	408/996-1010
Radius System 100	★★★/5.8	$18,350	$8700	all included	$9450	408/541-6100
ILLUSTRATION AND PUBLISHING						
Editors' Choice						
Apple Power Mac 8500/120	★★★★/7.7	$15,875	$4200	$1225 (RAM, keyboard)	$10,450	408/996-1010
Radius System 100	★★★/5.8	$16,750	$8700	–$1400*	$9450	408/541-6100

*Credit for 40MB of RAM removed by dealer (system comes with 72MB of RAM standard).





MONITOR

A quality 17-inch monitor costs about $1000 but is well worth it. Suitable brands include Apple, Mitsubishi, NEC Technologies, Philips Consumer Electronics, Radius, and Sony. Philips' hard-to-find $899 Magnavox 17B won our Editors' Choice award most recently (see "Big Picture, Big Value," October, 1995).

PRINTER

A 600-dpi PostScript printer meets most business needs, and the best ones run at 8 pages per minute or faster. These printers cost about $2300. Good choices include the Apple LaserWriter 16/600 PS (a recent Editors' Choice



winner; see "Top Office Printers," June 1995) and Hewlett-Packard 4M Plus. If you need color output, consider ink-jets (they're slow but cheap) before considering expensive color laser, dye-sublimation, or thermal-wax printers.



FAX MODEM

There's no reason to get anything slower than a 28.8-Kbps fax modem. They're cheap (about $250) and come in all shapes and sizes. Good choices are the U.S. Robotics Mac & Fax Sportster 28.8, GVC-Maxtech XM288E, and Global Village TelePort Platinum.

REMOVABLE STORAGE

You'll want an Iomega Zip ($200) or SyQuest EZ135 ($240) drive for archiving, backup, and file exchange. The Zip is easier to use, but the



SyQuest has higher capacity and faster data transfers. Still, we slightly prefer the Zip drives and suspect they will be more popular.



INTERNAL STORAGE

If you find that 1GB is not enough hard drive storage, or if you buy a Mac with a 500MB internal drive, get a second internal drive rather than an external unit—they cost less (about $300 for 1GB) and you don't have to remember to turn them on before starting up the Mac, as you do with external drives.

KEYBOARD

Apple's Macs come with a mouse, but a keyboard is something you have to get yourself. That's fine—a keyboard is a personal choice, since all keyboards feel different. (Power Computing includes an extended



BUSINESS & PROFESSIONAL

Apple has scored a touchdown and two-point conversion with the Power Macintosh 7500/100, a speedy machine and the first Mac to offer an upgradable CPU and a case design that lets you easily add common components like a cache and RAM. A complete 7500 system is pricier than the competition, but it's a better-designed system that will cost less to upgrade, thanks to the replaceable CPU and the PCI slots; PCI cards tend to be cheaper than the NuBus equivalents used by the competition. Power Computing's new PowerWave 604/120 desktop, which offers the same essential features but is faster, joins the 7500 in the winner's circle. It began shipping in limited quantity as *Macworld* went to press.

We recommend a 100MHz PowerPC 601 or faster CPU as the heart of your system. You'll want at least 16MB of RAM, a 1GB hard drive, a 256K cache card, 1MB of VRAM, 10BaseT Ethernet, an extended keyboard, and a quad-speed CD-ROM drive. A Power Mac 7500 includes all but the keyboard and cache card; a PowerWave 604/120, all but the cache card. The price in the Basic System column below includes any of these features that the Mac system vendor offers; otherwise the cost to add the feature is in the System Essentials column.

For peripherals, a 17-inch monitor is the best option, so you can juggle several programs at once. You'll also want a 28.8-Kbps fax modem, a 600-dpi laser printer, and a removable drive. The total cost of these add-ons is listed in the Essential Peripherals column. For details on the best peripherals for the Power Mac 7500/100 or PowerWave 604/120, see the descriptions at left.

HOW THE COMPLETE SYSTEM PERFORMS

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
PowerWave 604/120	4.3	4.3	6.1	2.0
Apple Power Mac 7500/100	3.5	3.2	5.5	1.9
Power Computing Power 120	3.3	3.1	5.3	1.8
Radius 81/110	3.3	3.1	5.1	1.8
Power Computing Power 100	3.3	3.1	4.9	1.8

All results are shown as times as fast as a Centris 650 (Centris 650 = 1.0).



keyboard with its systems.) But no matter what feels right to you, expect to pay from $70 to $100 for an extended keyboard unless you buy Apple's overpriced model. If you type a lot, consider a contoured model to reduce stress on outer fingers.

RAM

Make sure you get at least 16MB with your Mac system—System 7.5 and today's business programs demand it. If you can spare another $375, get an 8MB SIMM to bolster



your RAM to 24MB. Make sure your Mac has a cache card as well (the 7500 and PowerWave do not) to get optimal performance from your PowerPC. A 256K cache card (you don't need more) costs about $300.

WHAT A BUSINESS-AND-PROFESSIONAL SYSTEM REALLY COSTS

System	Star Rating	Total Price	Basic System	System Essentials	Essential Peripherals	Phone
Editors' Choice Apple Power Mac 7500/100	★★★★/7.8	$7250	$3100	$400 (cache, keyboard)	$3750	408/996-1010
Power Computing Power 100	★★★★/7.1	$6650	$3400	all included	$3250*	512/258-1350
Power Computing Power 120	★★★★/7.4	$7050	$3800	all included	$3250*	512/258-1350
Editors' Choice Power Computing PowerWave 604/120	★★★★/7.6	$7250	$3200	$300 (cache)	$3750	512/258-1350
Radius 81/110	★★★★/6.9	$6800	$3000	$50 (VRAM)	$3750	408/541-6100

**15-inch monitor is included with system, so peripherals price has been adjusted to reflect substitution of a 17-inch model.*





MONITOR

To see both your project and the editing/creation software's own windows and palettes, you want a two-page monitor, so expect to spend about $2000. Good choices include NEC's MultiSync XE21 and NSA/Hitachi's RasterOps SuperScan Mc 21. If you're doing digital video, you'll want an NTSC monitor to preview your work; these cost about $500.

VIDEO-DISPLAY CARD

To drive that big monitor at 24-bit color depth, you need an



accelerated video-display card. A good accelerated card costs about $700, and several companies sell them, including ATI Technologies, EA Research, Matrox, and Radius.

DIGITAL-VIDEO CARD

The key component in any digital-video system is the digital-video card. While a Power Macintosh 8500's AV circuitry is fine for basic video capture, if you intend to do professional work on digital motion images, you will need the correct tool. The best options are



the Data Translations Media 100 and the Truevision Targa 1200. Figure on spending at least $5500. The 8500's built-in AV is fine for experimentation, but not for pro use.



PRINTER

All you really need is a basic laser printer for your invoices and correspondence, and you can get one for about $1200. A great choice is the Apple LaserWriter Select 360, which earned a rare five stars in a previous *Macworld* review.

FAX MODEM

There's no reason to get anything slower than a



28.8-Kbps fax modem. They're cheap (about $250) and come in all shapes and sizes. *Macworld* has favorably reviewed the GVC-Maxtech XM288E, the Global Village TelePort Platinum, and the U.S. Robotics Mac & Fax Sportster 28.8.

EXTERNAL STORAGE

Media files take up lots of room, and you will go through gigabyte drives as if they were mere floppies—a single project alone can easily fill up a 4GB drive. Get an 8GB RAID system; these cost about $3500, and the best of them use FWB's SCSI JackHammer card. But don't worry about removable media or backup sys-



tems—you have far too much data for those. Rely instead on RAID's data-protection schemes. One way to have sensible backup or portability is to get one of the new stackable storage systems from La Cie or MicroNet Technology—they make it easy to swap out drives.

MEDIA AUTHORING



Producing digital video or CD-ROM titles requires the best equipment. We chose the Apple Power Mac 8500/120 as the best media-creation platform for two reasons: all the advantages it offers as described for the Graphics and Publishing category, and—more important for media creators—it's not tied into a subpar set of creation tools.

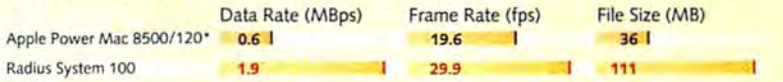
The VideoVision digital-video card included in Radius's System 100 media-creation bundle just doesn't do the job, as *Macworld* has noted in previous reviews, and Radius's high-end Telecast card is similarly subpar.

The 8500 comes with decent video-input and -output features that are fine for experimentation, low-budget, and simple media authoring. Pros, of course, will want more.

We recommend a 100MHz or faster CPU, preferably a 604. You'll want 32MB of RAM, at least a 2GB hard drive, a 256K cache card, 10BaseT Ethernet, an extended keyboard, and a quad-speed CD-ROM drive. An 8500 has all these, except for the keyboard, and you'll have to add RAM to the 16MB it ships with. The price in the Basic System column below includes any of these features that the Mac system vendor offers; otherwise the feature's cost is in the System Essentials column.

For peripherals, go for a 20- or 21-inch monitor, so you can see your editing window and software controls. You should also get a 28.8-Kbps fax modem, an 8GB RAID system (for your project files), and a 600-dpi laser printer. CD producers will need an accelerated video-display card and a CD-recordable drive. Video editors will need a digital video-editing card and an NTSC monitor. The total cost of these add-ons is listed in the Essential Peripherals column. For details on the best peripherals for the Power Mac 8500/120, see the descriptions at left.

HOW THE COMPLETE SYSTEM PERFORMS



*Tested without digital-video card, because of problems with the card borrowed for evaluation. With a working card, results should be comparable to the System 100's.



CD RECORDER

If you're producing CDs, you'll want to have a CD-recordable drive; prices have dropped, and they now cost about $2000.

KEYBOARD

Because Apple doesn't include a keyboard with its systems, you will need to spend $70 to $100 for one (avoid Apple's overpriced model). Get an extended keyboard, and be sure to get one that feels right to your hands.



RAM

Make sure you get at least 32MB with your Mac system—System 7.5 and today's media authoring programs demand it. At $700 per 16MB and $375 per 8MB, consider going up to 40MB, but don't worry about getting much more, unless you are doing 3-D modeling or rendering.



WHAT A MEDIA-AUTHORING SYSTEM REALLY COSTS

System	Star Rating	Total Price	Basic System	System Essentials	Essential Peripherals	Phone
CD-AUTHORING						
Editors' Choice Apple Power Mac 8500/120	★★★★/7.7	$14,875	$4700	$1225 (RAM, keyboard)	$8950	408/996-1010
Radius System 100	★★★/5.8	$14,050	$10,500	–$1400*	$4950	408/541-6100
VIDEO EDITING						
Editors' Choice Apple Power Mac 8500/120	★★★★/7.7	$18,875	$4700	$1225 (RAM, keyboard)	$12,950	408/996-1010
Radius System 100	★★★/5.8	$16,750	$10,500	–$1400*	$7650	408/541-6100

*Credit for 40MB of RAM removed by dealer (system comes with 72MB of RAM standard).





MONITOR

To see your data and the software you use to report your results, you'll want a large monitor. Since most companies have phased out 19-inch monitors, you'll likely end up buying a 20- or 21-inch model. Expect to spend about $2000. NEC Technologies and NSA/Hitachi offer some good choices.

REMOVABLE STORAGE

To store the large amounts of data that are common for a research project, but still retain the ability to



access the data relatively quickly whenever you need it, the best option is a 1.3GB magneto-optical drive. Such a drive will cost you about $2000. You could save about $900 and use a DAT drive instead, but tape is slow and not a reliable medium for long-term archiving.

PRINTER

The best printer varies widely for scientists and engineers. If you need color output, consider an ink-jet printer (about $500) or dye-sublimation printer ($5000 to $15,000, depending on your needs). Dye-sublimation printers are best if the color in your data is critical or if you need large-size output, and ink-jet printers are best if you will just be doing short runs for presentations. For high-volume output of text or black-and-white images, go with a good 600-dpi business laser printer (about $2300), and for a small volume of output, get a good 600-dpi personal printer (about $1200).



FAX MODEM

There is no reason to get anything slower



than a 28.8-Kbps fax modem. These devices are cheap (costing about $250), and they come in a wide variety of shapes and sizes. Three good choices are the XM288E from GVC-Maxtech, TelePort Platinum from Global Village, and Mac & Fax Sportster 28.8 from U.S. Robotics. If you are at a facility with ISDN connections, consider an ISDN modem (about $500) or ISDN/analog modem (about $700). The popularity of the Internet and remote databases in education and research is quickly making fast ISDN connections a must.



INSTRUMENTATION CARDS

If you will be controlling lab equipment or analyzing device data, you are going to need an



SCIENCE & ENGINEERING

Although known best for its graphics, publishing, and media-authoring products, Radius offers the best system for scientists and engineers. The 81/110 noticeably outperforms a Power Macintosh 7500 in scientific calculations but costs about $500 less—a real concern for budget-constrained schools and private R&D labs.

The 81/110's use of NuBus instead of PCI as its expansion bus wasn't a concern to scientists we asked; the cards they might use are available for both buses. For scientists and engineers who use cards, there's no reason to favor NuBus over PCI—or PCI over NuBus. And if you don't need cards, the bus type is definitely not a factor in your decision.

Radius recently laid off half its staff, and its long-term clone business is in question. We still recommend the 81/110, since it is essentially a repackaged Power Mac 8100/110. But if you're concerned about Radius's state, look to a PowerWave 604/120 from Power Computing (see the Business and Professional section). With a $249 riser, it can accept both NuBus and PCI cards. If your fieldwork takes you on the road, also consider a PowerBook 5300es.

We recommend a 100MHz PowerPC 601 or faster CPU as the brains in your Mac. You'll want at least 16MB of RAM, a 700MB hard drive, a 256K cache card, 1MB of VRAM, 10BaseT Ethernet, an extended keyboard, and a quad-speed CD-ROM drive. Radius's 81/110 comes with all but the VRAM. The price in the Basic System column below includes any of these features that the Mac system vendor offers; otherwise the feature's cost is in the System Essentials column.

For peripherals, get a 20- or 21-inch monitor so you can see data in one window and have a spreadsheet or word processor open in another. You'll also want a 28.8-Kbps fax modem, and a magneto-optical (MO) or digital audiotape (DAT) drive (the MO drives are faster and more reliable). The total cost of these add-ons is listed in the Essential Peripherals column below. In addition, you'll want a printer, although that can range from ink-jet to dye-sublimation, depending on the kind of data you need to print—an ink-jet is fine for Excel charts used in overhead slides, while you'll want dye-sub for color-sensitive work like mapping. And you may need an instrumentation card for controlling test equipment.

instrumentation card to do the trick. National Instruments, for example, offers a variety of cards for NuBus-, PCI-, and even PC Card–based systems for fieldwork. Prices range from $200 to more than $1000.

RAM

Make sure that you get at least 16MB of RAM with your Macintosh system—System 7.5 and today's science and engineering programs demand it. If your budget can spare another $375, you should also get an 8MB SIMM to bolster your RAM to 24MB. The Radius 81/110 comes



with a 256K cache card, which should be sufficient unless you are going to be compiling software fairly frequently (in this case, you should look for a 512K or even a 1MB cache card; prices for these cards range from $400 to $750).

HOW THE COMPLETE SYSTEM PERFORMS

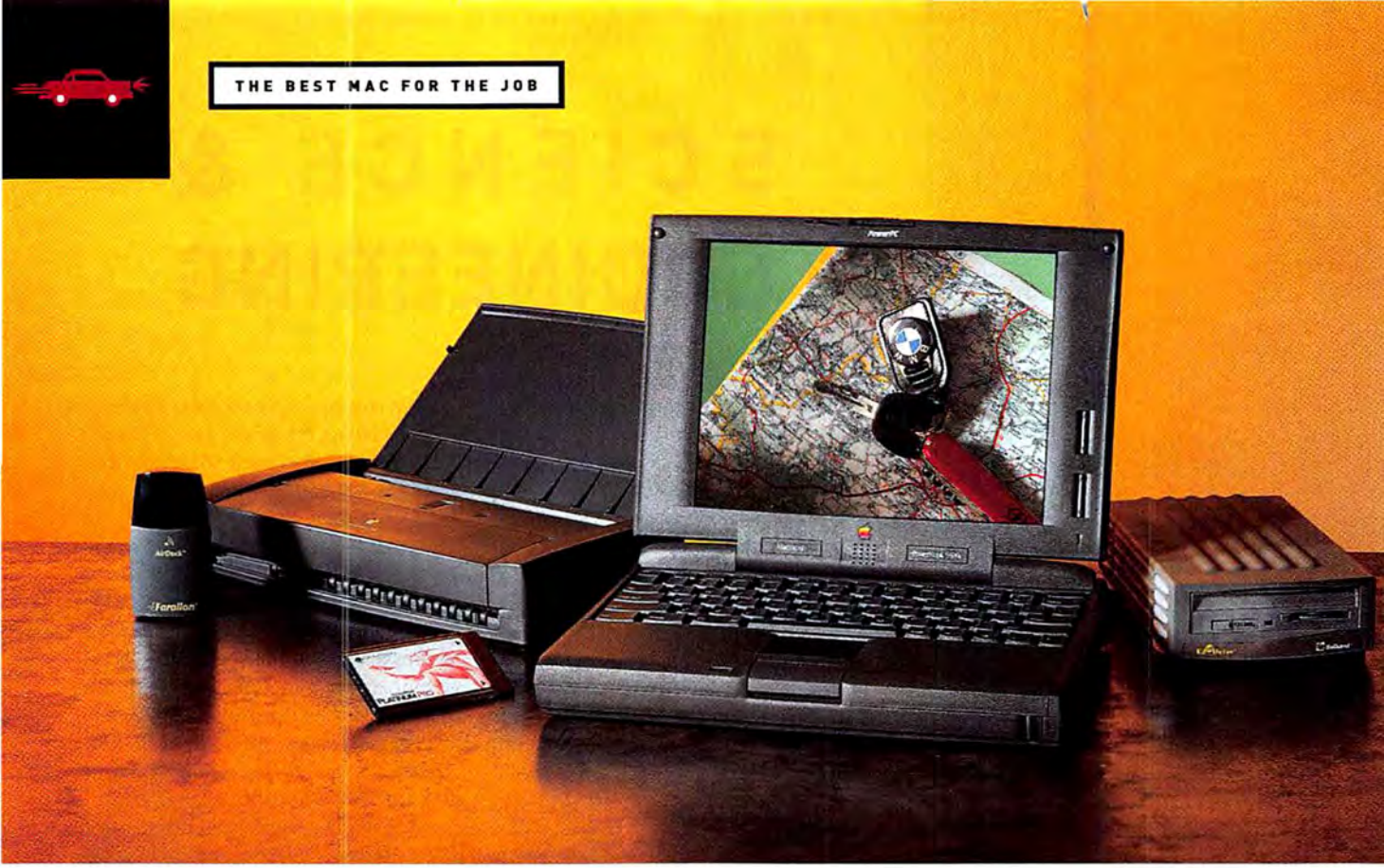
	Overall Score	Mathematical	Biotechnology	Statistical
Apple Power Mac 7500/100	3.3	2.8	0.8*	4.6
Radius 81/110	3.6	3.0	0.8*	5.3

All results are shown as times as fast as a Centris 650 (Centris 650 = 1.0).
*Frequent disk access caused significant slowdown in System 7.5's 680X0 emulation.

WHAT A SCIENCE-AND-ENGINEERING SYSTEM REALLY COSTS

System	Star Rating	Total Price*	Basic System	System Essentials	Essential Peripherals*,**	Phone
Apple Power Mac 7500/100	★★★★/7.8	$8050	$3100	$400 (cache, keyboard)	$4550	408/996-1010
Editors' Choice Radius 81/110	★★★★/6.9	$7600	$3000	$50 (VRAM)	$4550	408/541-6100

*Subtract $900 if you get a DAT drive instead of magneto-optical. **Does not include cost of printer or of data-acquisition or instrumentation cards, since the type of device needed, if any, varies greatly across disciplines.





REMOVABLE STORAGE

A floppy holds too little, and PC Card hard drives cost too much. Because today's PowerBooks run industrial-strength programs, you'll have industrial amounts of data. To deal with that, get an Iomega Zip ($200) or SyQuest EZ135 ($240) drive for archiving, backup, and file exchange. The Zip is lighter and easier to use, so it's our first choice. Don't forget the required SCSI adapter (about $30).

PRINTER

If you're printing on the road, get a portable inkjet printer like Apple's Color StyleWriter 2200, which costs about $400. Note that it goes through ink cartridges pretty quickly, so keep a supply on hand. If you need a higher-volume printer, check out the recommendations in the Home and Small Office category.



FAX MODEM/ ETHERNET CARD

Unless you will be working alone, you'll want a combination Ethernet/28.8-Kbps fax modem PC Card so you can plug into the rest of the world. These combination cards cost about $600 and are available from Dayna Communications and Global Village, among others. If you have no need for network access, you will only need to spend about $350 to get a PC Card 28.8-Kbps modem.





RAM

Almost anyone who's doing serious work on a PowerPC-based Macintosh needs to have 24MB of RAM, so be sure that you add 8MB to the 5300c's standard 16MB.

ACCESSORIES

PowerBooks are lightweight and of course portable, so it's amazing how quickly you can accumulate add-ons that make them heavier and less portable. But you do need some accessories, including a spare battery (about $140), a carrying case



(about $70 unless you're extravagant), and an infrared pod for your desktop system for wireless networking ($80). If you use your PowerBook as your main system at home or in an office, also get an extended keyboard, your preferred style of input device, and a 15-inch monitor; these will add about $675 to the total cost.

HOW THE COMPLETE SYSTEM PERFORMS

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
PowerBook 5300	2.3	1.6	8.5	1.4
PowerBook 5300c	2.1	1.5	8.7	1.2
PowerBook 5300cs	2.1	1.4	8.8	1.2

All results are shown as times as fast as a PowerBook 520c (520c = 1.0).

WHAT A ROAD-WARRIOR SYSTEM REALLY COSTS

System	Star Rating	Total Price	Basic System	System Essentials	Essential Peripherals	Phone
Apple PowerBook 5300	★★★/5.8	$4560	$2300	$700 (RAM)	$1560	408/996-1010
Editors' Choice						
Apple PowerBook 5300c	★★★/5.9	$6560	$4600	$400 (RAM)	$1560	408/996-1010
Apple PowerBook 5300cs	★★★/5.8	$5560	$3600	$400 (RAM)	$1560	408/996-1010

ROAD WARRIOR

The freedom—or requirement—to work anywhere means you need a notebook, and for Macintosh users, that means an Apple PowerBook. No portable clones are in sight for at least six months, so the question is what model in the PowerBook 5300 series is the right one. (When they ship later this year, the Duo 2300's should be great if you hook them up to desktop equipment when working for long periods or if your mobile work is intermittent.) When you get down to it, the only substantive difference among all the 5300 models is the type of screen.

You can immediately drop the plain 5300—there's no reason to go for a passive matrix gray-scale display. At the other end of the spectrum is the PowerBook 5300ce, whose active matrix color screen runs at a cramped 800-by-600-pixel resolution. The 5300ce is meant to be a multimedia notebook, but it lacks a key component: a CD-ROM drive. Also, it was not shipping at press time. The real choices are the active matrix color PowerBook 5300c and the passive matrix color 5300cs. For us, the 5300c wins, because if you use a PowerBook a lot, you'll want the better image and text clarity of active matrix. Passive matrix has gotten good enough for part-time use, but it's still not for serious road warriors.

We recommend a PowerPC-based portable, with an external video connector, PC Card slots, 24MB of RAM (to reduce hard drive usage and prolong battery life), at least a 500MB hard drive, and a 10.4-inch screen. The 5300c includes all this, but you will have to add 8MB of RAM to its built-in 16MB. The price in the Basic System column at left includes any of these features that the Mac system vendor offers; otherwise the feature's cost is in the System Essentials column.

For peripherals, you'll want a fax modem/Ethernet combination card, an infrared pod for your desktop system, a portable ink-jet printer, a removable drive, an extra battery, a carrying case, and a SCSI adapter. The total cost of these add-ons is listed in the Essential Peripherals column at left.

CONTINUED FROM PAGE 98

System 7.5, code-named Copland, won't work with 680X0 Macs—even if they have a PowerPC accelerator card. Home and small-office users, as well as schools, can get away with a Quadra-level Mac or 500-series PowerBook for another year or so, but be prepared to upgrade again after Copland arrives sometime in early 1997.

To see what performance a used Mac will give you, see the benchmark "How Each Mac Stacks Up." It also includes pricing information, so you can see if the savings are worthwhile—or what you can get for your old Mac.

And the Beat Goes On By the time you read this, one more Mac system option will be available.

DayStar's multiprocessor Genesis MP system began shipping in small volumes as we went to press, but DayStar declined to provide *Macworld* with an evaluation unit because only one widely used program—Adobe Photoshop 3.04—can take advantage of the $10,000 system's four CPUs; Strata's StudioPro 1.75 3-D modeling software is also available for the Genesis. When tested with other programs, DayStar insisted, the Genesis's performance would only be equivalent to that of a Power Mac 8500/120 but would cost three times as much. DayStar has a point: unless you use Photoshop all day for high-end filtering (such as at a service bureau), the Genesis MP is not for you.

As more programs become multiprocessor-savvy, other specialty high-end users (such as those doing three-dimensional modeling) might consider the Genesis MP. If you are one of these specialized users, expect a speedup of 2.5 to 3 times over a Power Mac 8500/120 for multiprocessor-savvy programs, based on Macworld Lab's look at a prototype system (see "Tantalizing Potential of Four CPUs," *Power Mac News*, September 1995).

IT'S A GREAT TIME TO LOOK FOR A NEW MAC SYSTEM

The Last Word

After putting these systems through their paces, we had several surprise winners. For example, Apple did not win in the Home and Small Office category, despite its big Performa push, and Radius did not win in the Media Authoring or Graphics and Publishing categories, despite its years of experience providing add-ons for these users. It just shows that you can't always rely on yesterday's reputation to make the right choice today.

Some things are less of a surprise: you'll notice a definite prejudice toward PCI-based Macs. We believe it makes little sense to buy a NuBus-based Mac unless you have no need for expansion cards (while many NuBus cards are available today, the number will decline over time) or you already have a huge investment in NuBus cards that you don't intend to replace.

And you'll notice the exclusion of 680X0-based Macs. There's simply no reason to buy a new 680X0 Mac system. The system makers know this, which is why only Apple still offers 680X0-based computers: its remaining stock of Performa 630's, which should be gone by 1996, and the PowerBook 190. Pass on both.

It's a great time to look for a new system, what with interesting technologies like QuickDraw 3D and QuickTime VR coming to market. And the PowerPC performance of today's Mac systems—from all companies—beats the old 680X0 speed by a mile, at prices that have never been better. Enjoy your new Mac! **m**

Executive editor GALEN GRUMAN recently bought a new Mac system—and followed his own recommendations when he spent his own money. Research assistance by assistant editor JIM FEELEY and technical analyst DANNY LEE.

HOW EACH MAC STACKS UP

Wondering how the Mac you want to buy—or sell—stacks up against the other Mac systems? Macworld Lab tested all the principal contenders with its real-world, task-oriented test suite to find out.

Longer bars are better. Products are listed alphabetically in categories.

	Overall Score Indicates typical performance in a mixed-use environment, such as a company or school.	**CPU-Intensive** Indicates performance for most business and personal tasks.	**FPU-Intensive** Indicates performance for analytical, 3-D, and other specialized uses.	**Disk-Intensive** Indicates performance of the Mac's data-transfer capability, which affects all users.	**Price** Average price for used system* or company-estimated street price for new system.
Desktop Systems (times as fast as a Centris 650; Centris 650 = 1.0)					
Apple Centris 650	1.0	1.0	1.0	1.0	$975
Apple Macintosh IIci	0.5	0.5	0.4	0.7	$450
Apple Performa 5215CD	2.0	2.1	2.5	1.2	$2300
Apple Power Macintosh 6100/60	1.8	1.8	2.5	1.1	$1100
Apple Power Macintosh 6100/66	2.3	2.2	3.5	1.3	$1200
Apple Power Macintosh 7100/66	2.2	2.1	3.1	1.3	$1550
Apple Power Macintosh 7100/80	2.4	2.3	3.4	1.3	$1600
Apple Power Macintosh 7200/75	2.6	2.5	4.0	1.3	$1600
Apple Power Macintosh 7500/100	3.5	3.3	5.5	2.1	$3100
Apple Power Macintosh 8100/80	2.7	2.6	4.1	1.4	$1250
Apple Power Macintosh 8100/100	3.2	3.0	4.9	1.6	$2100
Apple Power Macintosh 8100/110	3.4	3.3	5.2	1.9	$2200
Apple Power Macintosh 8500/120	4.2	4.3	6.0	1.8	$4200
Apple Power Macintosh 9500/132	4.8	4.7	7.1	2.3	$5800
Apple Quadra 630	1.2	1.2	1.2	1.2	$1100
Apple Quadra 800	1.3	1.3	1.3	1.1	$1000
Apple Quadra 840AV	1.4	1.5	1.7	1.0	$1080
Apple Quadra 950	1.2	1.2	1.2	1.1	$4360
Power Computing Power 100	3.3	3.1	4.9	1.8	$3400
Power Computing Power 120	3.3	3.1	5.3	1.8	$3800
Power Computing PowerWave 604/120	4.3	4.3	6.1	2.0	$3200
Power Computing PowerWave 604/132	4.5	4.4	6.7	2.1	$3700
Power Computing PowerWave 604/150	4.9	4.8	7.4	2.2	$4500
Radius 81/110	3.3	3.1	5.1	1.8	$3000
Radius System 100	4.0	4.2	5.2	1.8	$10,500
Notebook Systems (times as fast as a PowerBook 520c; 520c = 1.0)					
Apple PowerBook 190 **	1.6	1.4	1.3	2.0	$1900
Apple PowerBook 520c	1.0	1.0	1.0	1.0	$1500
Apple PowerBook 540c	1.2	1.2	1.3	1.1	$1990
Apple PowerBook 5300	2.3	1.6	8.5	1.4	$2300
Apple PowerBook 5300c	2.1	1.5	8.7	1.2	$4600
Apple PowerBook 5300ce **	2.1	1.5	8.4	1.2	$6800
Apple PowerBook 5300cs	2.1	1.4	8.8	1.2	$3600
Apple PowerBook Duo 2300c **	1.8	1.3	7.4	0.8	$3700

**Prices for used systems are based on data from American Computer Exchange. ** Expected to ship in January 1996.*

BEHIND OUR TESTS

Macworld Lab tested several functions in eight key applications plus the Finder to determine real-world performance for the critical performance areas faced by most users. CPU-Intensive tasks evaluate the Mac's essential computing performance, FPU-Intensive tasks gauge performance for operations that take advantage of the floating-point unit, and Disk-Intensive tasks gauge the performance you'll get for launching programs, and opening, closing, and copying files.

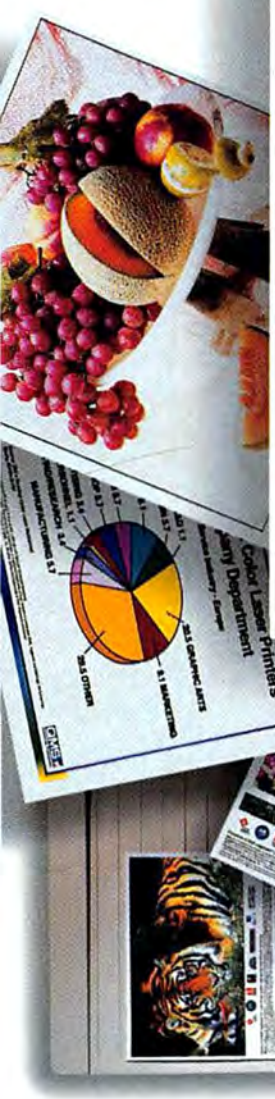
We then averaged the results to determine the Overall Score, giving the CPU-Intensive score 60 percent of the weight and the FPU and disk scores 20 percent each. These results are comparable with *Macworld* benchmarks published since the January 1995 issue. We tested native versions of software on the Power Macs and 680X0 versions for the pre-PowerPC Macs. The software includes System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our Power Macs had 24MB of RAM and a 256K cache, while 680X0 Macs had 16MB of RAM; all ran with 8-bit color on 17-inch color monitors.

For the six usage categories elsewhere in this article, Macworld Lab created a task mix that tests real-world performance for each category.

- The Business and Professional category used the standard *Macworld* test suite.
- The Graphics and Publishing suite focused on special image effects in Photoshop, disk reads and writes, and scrolling, plus overall computation speed.
- The Media Authoring suite focused on video-capture throughput and frame rates, disk access, and overall computation speed.
- The Home and Small Office/Road Warrior suite was based on a subset of the standard *Macworld* test suite. We focused on the same areas of CPU, FPU, and disk performance, but tailored the applications. Tasks included playing a presentation, sorting a database, recalculating simple spreadsheets, and general word processing.
- The Science and Engineering suite focused on a broad range of calculations in Wolfram Research's Mathematica 2.2.2, The MathWorks' MATLAB 4.2, Gene Code's Sequencer 3.0, National Instrument's HiQ 2.1, SAS Institute's JMP 3.1, and Abacus Concepts' StatView 4.1.

—Macworld Lab testing supervised by Danny Lee

POWER
FULL COLOR
POWER
FULL NETWORKING
POWER
FULL PRINTING



Actual sample printed on the QMS magicolor CX Laser Printer

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The FAA Demands The Precision Of Trinitron Technology Every Day.



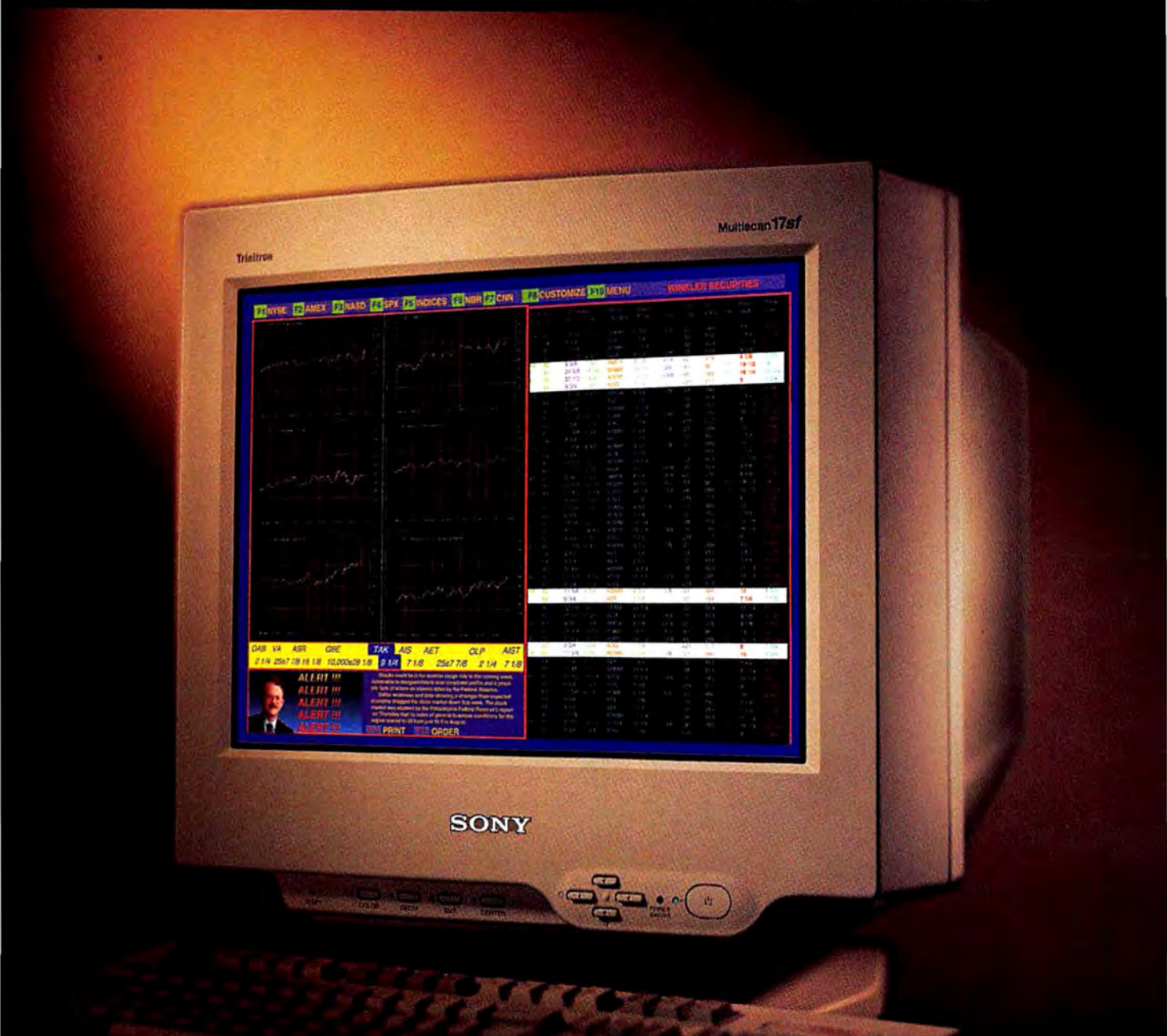
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INSPIRING VISION

Trinitron

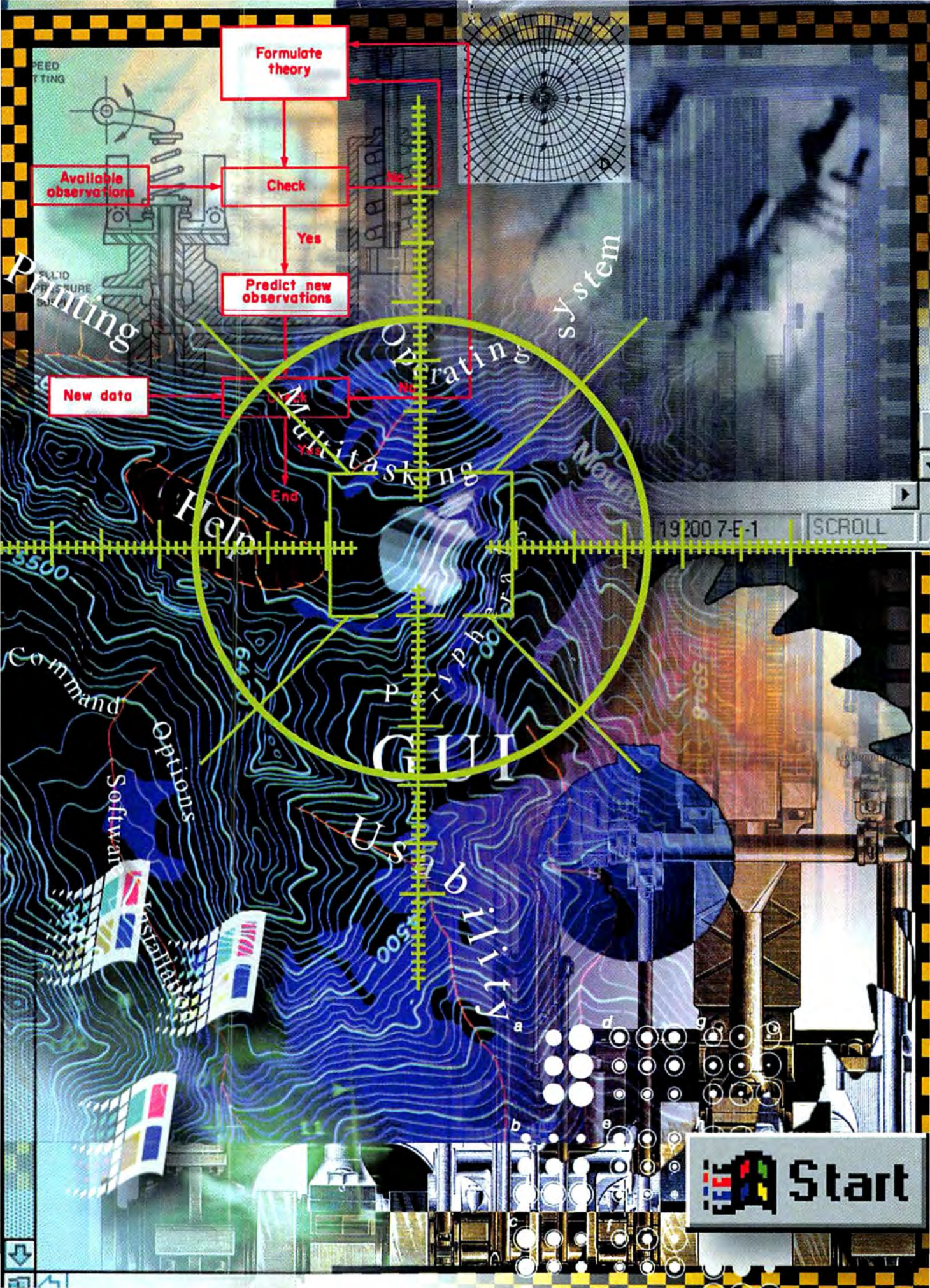
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Traders Demand The Precision Of Trinitron Technology Every Minute.



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SONY


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Available observations
Check
No
Yes
Predict new observations
New data
End
Printing
Operating system
Multitasking
Help
GUI
Usability
Peripherals
Command
Options
Software
Installation
19200 7-E-1
SCROLL
Start

Macworld Lab finds out if Windows 95 has finally caught up

MW LAB Is the Mac Still the Easiest to Use?

BY HOWARD BALDWIN

In war movies, an eerie whistle signals a bomb's approach from the moment it leaves the plane. By now everyone on the planet has heard the whine of Windows 95 being launched, accompanied by the multimillion-dollar explosion of a Rolling Stones soundtrack. But when bombs explode in war movies, they produce more noise and smoke than real damage. In Microsoft's ongoing battle to match the Macintosh's ease of use, is this latest iteration a dud—or will it leave a crater where Apple used to be? ◆ Put in less martial terms, is Windows 95 as easy to use as a Macintosh? As easy to configure? Does it make setting up peripherals as easy? Is Windows 95 now the most usable operating system on the desktop, or does the Macintosh OS still reign? ◆ We've heard these questions before. Windows 95 is just the latest salvo in Microsoft's war over the graphical user interface, a war that began with OS/2 back in 1987. At that time, Microsoft and IBM jointly created Presentation Manager, a graphical interface for the OS/2 operating system. Presentation Manager failed. Microsoft tried again with a

JEFF BRICE

graphical interface for DOS, called Windows. Versions 1.0 and 2.0 were greeted with yawns, and version 3.0, while exciting, crashed a lot. Windows 3.1 was a hit, though still closer to plug-and-pray than plug-and-play. This year, the weapon is Windows 95, and Microsoft's aim may be getting more accurate.

Putting It to the Test

The operating system—the basic language of a computer—handles fundamental tasks underlying all operations. Working with the OS is the closest you get to actually talking to your computer—an operating system's *usability* is the measure of how easily you can tell your computer what to do and how well you can understand what your computer is trying to tell you.

To determine whether our Mac-favoring readers have anything to fear, we tested certain key aspects of the operating systems for usability—that is, to determine how easily users can understand and modify the look and feel of information on screen, keep track of files and space on the hard drive, install new applications and peripherals, get help when they're flummoxed, and carry out other standard functions an OS is responsible for. With our sister publication, *PC World*, we brought eight people—each experienced primarily in either OS/2, Macintosh, Windows 95, or Windows NT—into our usability lab and had them run through a battery of tests on the three operating systems with which they were unfamiliar. (This article focuses on results for the Mac and Windows 95.)

One reality emerged clearly from our tests: The holy grail of a perfect OS doesn't exist. There are things people love about Windows 95, but things they hate too. And the same goes for the Mac OS. Like new parents, most computer users—of Macs and Windows 95 alike—are more likely to boast of their darling's charms than reveal its shortcomings.

In any case, it's important to remember that when people buy computers, they consider far more than the operating system, including what software is available, what networks they'll be connecting to, and the cost. For example, in the feature "The Publishing Face-Off," in this issue, we compare the suitability of the Mac and Win 95 for desktop publishing, where the Mac's long history continues to give it a decisive advantage for most users.

Usability Defined

One of the brilliant aspects of the windowing system that Apple commercialized is consistency. Does the operating system or the application behave the same way under different conditions? Is the information in the same place, or at least a logical place, every time you go to look for it? This is what makes an OS learnable. For instance, if you double-click on a folder in the Finder to reveal its contents and you find another folder nested inside, it's logical to assume that double-clicking on the nested folder will also reveal its contents. This may seem simplistic, but that's because it's so intuitive.

Cheers and Scorn for the Mac

I like

. . . that configuration changes happen immediately without my having to exit the dialog box.
Windows 95 user

. . . the control panel system for drivers, which is excellent.
OS/2 user

. . . that the OS always seems to be one step ahead, opening the right windows and presenting the user with just the right choices.
Windows NT user

I don't like

. . . that there are no help buttons in dialog boxes.
Windows 95 user

. . . that opened windows always manage to place themselves squarely over previously opened windows.
Windows NT user

. . . the way I had to hunt around for the different configuration settings.
OS/2 user

Imagine how confusing it would be to navigate the Finder (or the Windows 95 equivalent, a window accessed through the My Computer icon) if at one level double-clicking on a folder revealed its contents, but at the next level you were expected to click on a button labeled Open.

It's that kind of consistency we were looking for. Our testing was like that of any major software company: Microsoft, Novell, Lotus, Claris, and others maintain usability labs with staffs dedicated to understanding how people think about, and work with, computers. Admittedly, usability testing—part engineering and part psychology—is no exact science. The developers of operating systems and applications are challenged to figure out what users expect to find—the right words, the proper commands, the logical sequence—at any given moment.

Macworld will conduct more usability testing in the future to help identify the brainstorms and bugaboos of the newest applications.

The Usual Complaints

Our usability testing substantiated the usual complaints that Mac and Windows users make about each other's systems. If the Mac were human, it would be an engineer, because it believes there is only one way (well, maybe two ways) to do a job—oh, and yes, it's too complicated for you to do without some help. If the PC were human, it would be an economist, because there are three obvious ways to do something and at least one esoteric one—and you figure out for yourself which way you like best.

For instance, to access Macintosh Guide, part of the Mac's Apple Guide help system, you use the mouse to select it from the Question Mark menu, unless you already know that ⌘-? also opens the Guide. But once you're in Macintosh Guide, you must always use the mouse—say, to get to the Macintosh Tutorial or Shortcuts components of Apple Guide. To get to help in Windows 95, you need to click on the Start button to open the Start menu, where the Help command is, but once you get that far you can use the keyboard—the *H* of *Help* in the menu is underlined as a visual clue. Press the H key, and you can navigate all through the help section with the keyboard or the mouse. Some people enjoy the flexibility of being able to choose between the key-

How Easy Is Printing?

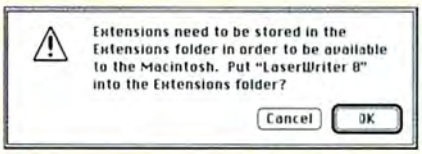
CONFIGURING A PC TO WORK

with a new printer used to be a nightmare in Windows. Win 95's Add Printer Wizard demands that Mac loyalists reconsider their high opinion of the Chooser.

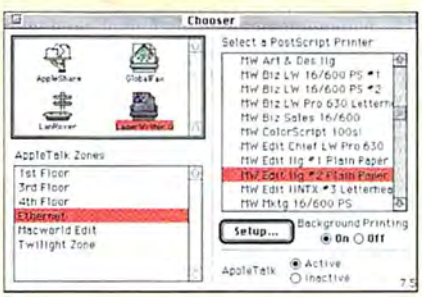
Installing a Mac Printer Driver



1 The Mac gives you no hint about how to configure it to use a new printer (except through Apple Guide, the Mac's excellent help system—see the sidebar "How Useful Is the Help Feature?").

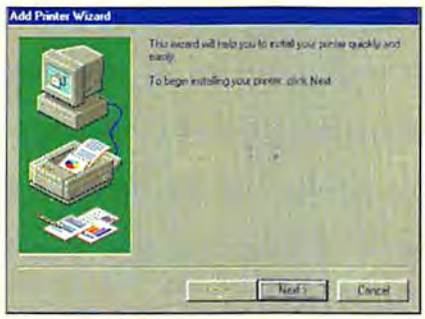


2 But once you make the logical leap that the printer driver belongs somewhere inside the System Folder, you can simply drag the driver to the System Folder, and the Mac offers to install it for you.



3 Now comes the confusing part. There is nothing to tip you off that, with the driver installed, you go to the Chooser to select the printer. Once you stumble into the Chooser, you must indicate that you're looking for printers (the Chooser manages other kinds of devices as well), show it where on the network the printer lives, and finally, pick the printer by the name your network administrator gave it.

Windows' Add Printer Wizard



1 After you launch the wizard, which you access from the Installing a Printer help topic, the wizard asks you to choose the type of printer from a long list of printer types that Win 95 knows about.



2 If Windows doesn't recognize the printer, you can pop in the printer's disk to let Windows install the driver.



3 After the wizard is done, the new printer appears in the Printers folder inside My Computer, which is Win 95's equivalent of the Mac desktop. Click on the printer you want to use and you're ready to print.

board and the mouse—they're also the ones who like fine-tuning computers. Others appreciate the Mac's take-the-user-by-the-hand feeling. Like many Macintosh users, they're attuned to the computer purely as a tool and not as an end in itself.

Microsoft is setting up Windows 95 as more Mac-like, and it's easy to chart where that strategy succeeds and where it fails. I've broken this down into four categories: first, areas where Windows was, and still is, superior to the Macintosh; second, areas where the Macintosh was, and still is, superior to Windows; third, how Windows 95 has caught up with the Macintosh; and fourth, how the two operating systems are still even. Interestingly, no matter what most testers thought about a particular task or attribute of the OS, there was always a minority opinion.

Where Win 95 Beats Mac

If you've ever watched Windows users sit down at a Macintosh for the first time, you've probably noticed one thing: when they click on the menu bar they expect drop-down menus instead of the Mac's pull-down menus—none of this click-and-hold to access a menu. They also wonder why some menu items have no letter indicating a keyboard shortcut. Windows' has a penchant for shortcuts—all its commands have keyboard equivalents, which appear as an underlined letter in menu items, dialog box choices, and elsewhere. When a menu stays open, users can navigate to the subcommand they want by using the arrow keys or by typing the alt key and the underlined letter. On the Mac, users must drag the mouse down, over, and down again to reach items buried in hierarchical menus. Virtually all Macintosh applications, including the Finder, have some keyboard shortcuts (pioneered initially in Microsoft's Mac applications), but they're there at the developer's discretion and don't have much consistency. Windows, on the other hand, demands them, based on its heritage as a character-based, keyboard-driven system (there were days, hard to remember, when some computers didn't use mice). At least one tester complained about the Mac's "menus that don't stick."

When the mouse did finally enter the Windows world, it went the Mac one better with a second button. The Mac's one-button mouse was a bit of a stumbling block for some testers, even though it

took Microsoft until now to standardize on a purpose for the right-hand mouse button (it's now reserved for bringing up context-sensitive menus, an idea borrowed from OS/2). With older Windows applications, clicking the second mouse button is an adventure—you never know exactly what it will do. In Word for Windows 2.0, for instance, the right-hand mouse button highlights text vertically instead of horizontally; in WordPerfect 5.2, it doesn't. You can, of course, use two-button mice with the Macintosh, but there's no standard purpose for the second button. (If the idea of two mouse buttons scares you, stay away from Unix workstations and their three-button mice.)

The testers liked Windows 95's preemptive multitasking capability, in which the OS controls how much attention each application gets from the CPU. "I really liked being able to work while faxing a document," noted one die-hard Macintosh user, acknowledging that Apple has a much more formidable competitor now in terms of multitasking. Apple's System 7.5 uses cooperative multitasking, which provides a degree of multitasking but only with applications designed to cooperate by sharing the CPU—that's what makes it possible to start a download in your telecom program and go back to writing a memo in your word processor. Not until Copland comes out, probably late in 1996, will Apple users get preemptive multitasking, and that will be only for operating-system tasks and some tasks within programs. Gershwin, Copland's follow-on, will add Windows 95–like preemptive multitasking for applications themselves. For the record, Windows 95 is only preemptively multitasking with 32-bit applications, of which just a handful are available; for Windows 3.1 apps, it falls back on cooperative multitasking.

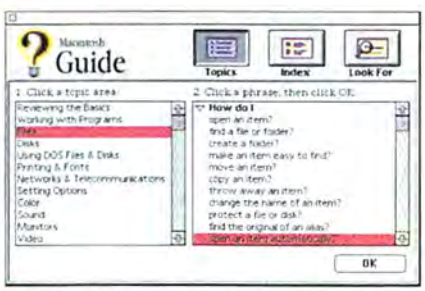
Where Mac Beats Win 95

If, as the doomsayers predict, Apple is acquired, perhaps the safest jobs there belong to those who write documentation. These folks know what they're doing. The one aspect of System 7.5 that received almost universal praise in our testing was the Apple Guide help system. A professional programmer and OS/2 user remarked that Apple Guide is "probably the best help system I have encountered. The animated screen help—the red circles|, which the system draws to highlight items on screen|—is very useful,

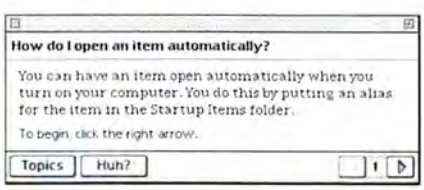
How Useful Is the Help Feature?

THE MAC AND WIN 95 OFFER A choice between hand-holding and expert-user methods for performing many standard OS tasks. The hand-holding methods, Macintosh Apple Guide and its Windows equivalent, wizards, take you step-by-step through your task, but they differ fundamentally: Macintosh Guide teaches you the expert-user method as it performs the task, while Windows wizards simply perform the task and leave you no wiser (for an example of a wizard, see the sidebar "How Easy Is Printing?").

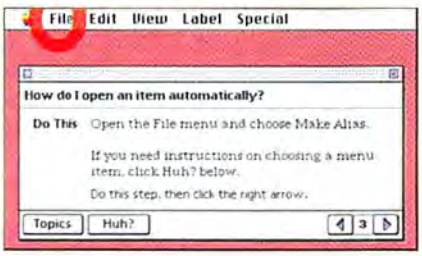
Macintosh Apple Guide

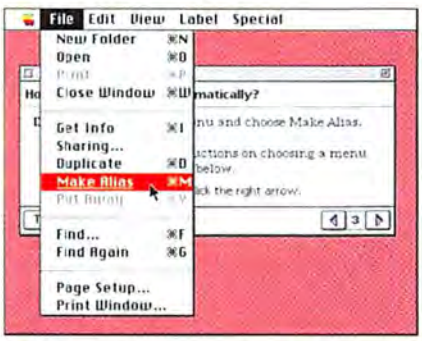


1 To perform a task with Macintosh Guide's assistance, you choose from a list of topics—in this case, configuring the Mac to open a particular file at start-up.



2 Like any good instructor, Guide tells you what you're about to do: put an alias of the file you want to open at start-up in the Startup Items folder.





3 After asking you to select the file, Guide shows you, by circling the correct menu and displaying the command in red, how to make an alias of it.



4 The alias you've just created is a real alias—Guide will tell you to do it again if it detects that you haven't completed the step. Next, Guide directs you to the Startup Items folder inside the System Folder. Once you get there, Guide tells you to drop the alias into the folder and you're done. Next time you want to add an item to the Startup Items folder, you won't need Guide to walk you through it—you can repeat the steps you've just learned.

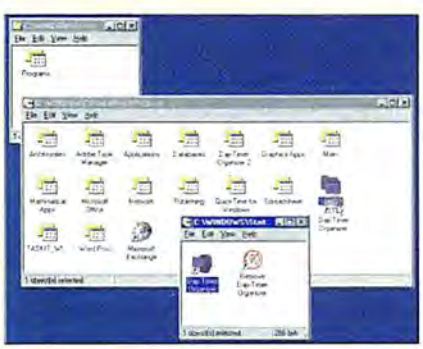
Windows Wizards



1 If you don't ask a wizard to perform a task for you, or if there is no appropriate wizard available, Windows 95's Help facility is simply a list of the steps to take—in this example, the six steps for putting a file in the StartUp folder, which is equivalent to the Mac's Start-up Items folder.



2 But guess what? There's an easier way to set up an item to launch automatically at start-up—Windows Help doesn't teach you the trick, and neither does the wizard. The trick is to click on the Start button with the right-hand mouse button to bring up the secret menu shown here, and select Open.



3 The Open command brings up the Programs icon, and clicking on this icon brings up the list of installed applications. Now simply select an application such as Day-Timer Organizer and drag it onto the StartUp folder's icon.

without being too intrusive." An MIS technician who uses Windows NT disagreed; he called it a "condescending and time-consuming ordeal" and recommended one help system for experts and another for newcomers.

Not all of the Mac's other advantages got the majority's stamp of approval. Some testers liked the ease of changing the desktop display font in the Views control panel; however, they also cited some initial confusion between the Views control panel and the Finder's View menu. The Mac's advantage here is that these kinds of changes take effect immediately; in Win 95, some take effect immediately, but others—for instance, changing the monitor resolution—require rebooting the computer.

Where Win 95 Caught Up

Is that it? you may ask. What about the Mac's celebrated advantages? Long file names for clearer file identification? Aliases for keeping representations of files wherever they're convenient? Ease of installing software and hardware? The Trash Can, for those of us who throw things away and then want them back? Bad news—Microsoft has broken the code and figured them out. It's even added a shut-down command, though it is counterintuitively accessed from the Start button.

Take software installation. On the Macintosh, you put a floppy or a CD into the drive and it automatically appears on the desktop. If the developer provides the software with an installation shell, which virtually all developers do these days, you just click on the icon that says Install and the Installer script takes care of the rest. One Windows NT user described installing a fax modem and its software on the Mac as "by far the easiest installation I have ever done." Under Windows 3.1, you had to check each application's initial disk to see whether you were supposed to type **a:install** or **a:setup**, because there was no standard for naming the Installer script.

Not anymore. Windows 95's new Installation Wizard completely automates installing software. (Microsoft first experimented with wizards in its applications; for an example, see the sidebar "How Easy Is Printing?") When it came time for our testers to install fax and video software under Windows 95, the user-configurable Installation Wizard impressed one Macintosh user enough to make him crow, "Installation was just as easy as, if not easier than, doing it on a Mac." As with the Macintosh, Windows 95–savvy CDs appear on the desktop automatically.

Then there's a command to retrieve files from the Trash Can, just as Macintosh users have been able to do for years. In Windows 95, the command is known as Restore; the Trash Can has been appropriately designated the Recycle Bin.

The testers also liked the ease of Win 95's highly touted Start button and My Computer icon. The My Computer icon corresponds to the Macintosh desktop—double-clicking on it brings up a window containing icons for local resources, including hard drives and volumes, as well as your computer's desktop; there's also the Network Neighborhood, an icon that leads to resources you can access over the network. My Computer also goes the Mac's desktop somewhat better by showing you all the printers you can access as desktop icons, saving you a trip to the confusing Chooser—a sticky point for the Macintosh, as we'll see below. Like the Mac, Windows 95 puts files in the same place where you go to use them—clicking on the Start button opens a hierarchical menu that provides access to programs, documents, settings, the Find command, and so on. (Windows 3.1's scheme involved the File Manager, where files were physically stored, and the Program Manager, where they appeared.) Many of the fundamental usability tasks we asked our testers to perform were initiated with icons visible in the My Computer window. As a result, many testers found subsequent tasks easy because they'd already noticed the appropriate icons during previous tasks.

Where They're Still Even

Guess what? As far as the Microsoft and Apple operating systems have come in usability, they still have a long way to go in reliability. Both the PCs and the Macs we ran the tests on crashed occasionally.

Both systems managed to confuse our testers when they tried to configure applications to launch automatically at start-up. Testers either couldn't find Windows 95's StartUp folder (not to be confused with the Start button), or they found it remarkably difficult to use, while it didn't occur to PC users to look in the Mac's System Folder to

find the Startup Items folder; they found it eventually either by accident or by checking the help system.

One Macintosh user complained that in Windows 95, the wizard that installs programs in the StartUp folder required him to select the StartUp folder itself. Why didn't the wizard know to head for the StartUp folder? On the Macintosh, of course, you just drag the application, or an alias of it, into the Startup Items folder (see the sidebar "How Useful Is the Help Feature?"). "It was downright silly" that the operating system didn't recognize what he was doing, he said. "In copying the Mac, Microsoft should have paid closer attention." But an OS/2 user was equally appalled at the same task on the Macintosh, calling it a "pain in the rear" and the hardest method of setting up applications to launch on start-up in any of the four operating systems. On the other hand, another OS/2 user said that doing the same thing on Windows 95 was "awkward for anything more than two layers deep" (that is, setting up a document nested within a folder to open).

We saved the worst for last. When the testers were asked to install an Apple LaserWriter printer, plugging the printer in was certainly easy, but when it came time to tell the operating system that the printer was there, the testers almost universally vilified the Chooser. They were particularly flummoxed by the printer choices in the Chooser, because none of the choices matched the model of the printer on the desktop. Hello? This is an Apple printer connected to an Apple computer, and users shouldn't have to guess. Windows 95 supplies a complete list of printer drivers; just choose your model from the list, and you're set.

A Windows NT user was surprised to discover that the Mac uses the Chooser, a miniapplication, to deal with printers and fax modems, asking, "Why not put it in the control panel along with every other peripheral?" Others labeled it "confusing" and "counterintuitive." This was not solely a System 7.5.2 problem, however. One experienced tester insisted that printer installation is "the bane of all users." Reaction to the same task in Windows 95 was split between those who found selecting a printer just as aggravating as using the Chooser and those who found it acceptable (see the sidebar "How Easy Is Printing?").

Cheers and Scorn for Win 95

I like

. . . the context-sensitive right mouse-button menus.
OS/2 user

. . . that there is a feeling that you can get down to the control level once you master navigation.
Windows NT user

. . . the avoidance of File Manager—the My Computer icon makes most functions simple and straightforward.
Macintosh user

I don't like

. . . that the Start menu is awkward for anything more than two layers deep.
OS/2 user

. . . the way the printer install froze when it had the wrong disk. I wonder how often this type of thing happens.
OS/2 user

. . . the sense of disjunction between the desktop and the actual operations of the system.
Macintosh user

The Last Word

There was really only one consensus about Windows 95: It's an improvement over Windows 3.1. None of the Macintosh users proclaimed it so good that they would switch, nor did any of the other testers proclaim the Mac OS so intuitive that they would never again use an Intel box. Testers frequently compared the operating systems' methods with those of the OS they used—usually unfavorably. In operating systems, familiarity breeds contempt—for the other guy.

We really wanted to determine if there was any substance behind Win 95's $100 million marketing hoopla. It turns out there is something valuable in Win 95—for Windows 3.1 users. For Macintosh users, the only difference is that the competition has gotten better. Is there anything inherent to Win 95 that will threaten the Mac's dominance in graphics, publishing, and other content-creation fields? No. Is there anything that makes Win 95 better for the home or education markets? No. In fact, because Windows 95 demands as much memory and other hardware resources as the Macintosh OS, you may start seeing more price parity.

A great Windows 95 is not necessarily bad for Macintosh users. Frankly, operating systems need competition. Microsoft wouldn't have needed to build Windows 95 if there hadn't been an option like the Macintosh. And suppose John Sculley had licensed the Mac OS ten years ago and swarmed the desktop market, preempting the creation of Windows 1.0? Would we be anticipating a multitasking, multiprocessor operating system like Copland next year, or would it still be years away?

None of the operating systems came off as the be-all and end-all. And few testers failed to complete all of the tasks we assigned them, because fundamentally, all operating systems do the same thing. It's kind of like getting into a rental car: they hand you the key, and as you slide into the driver's seat, you know that somewhere within arm's reach you'll find a slot to put the key in and start the engine—it might not come as automatically as in your own car, but you'll figure it out eventually.

Perhaps the Macintosh isn't as usable as its proponents think it is—but then, neither is Windows 95. The rapid pace of technology sometimes clouds our memory—after all, it wasn't until many years after cars made their appearance that mechanical engineers replaced hand-cranked starters with key-operated electric starters. Operating systems—even our favorites—still have a long way to go before they're truly intuitive. **m**

Senior editor HOWARD BALDWIN has worked on more computer platforms than he cares to remember.

The test script was devised by LAUREN BLACK, Macworld Lab director, and SUSAN SILVIUS, usability testing manager for the PC World Test Center.



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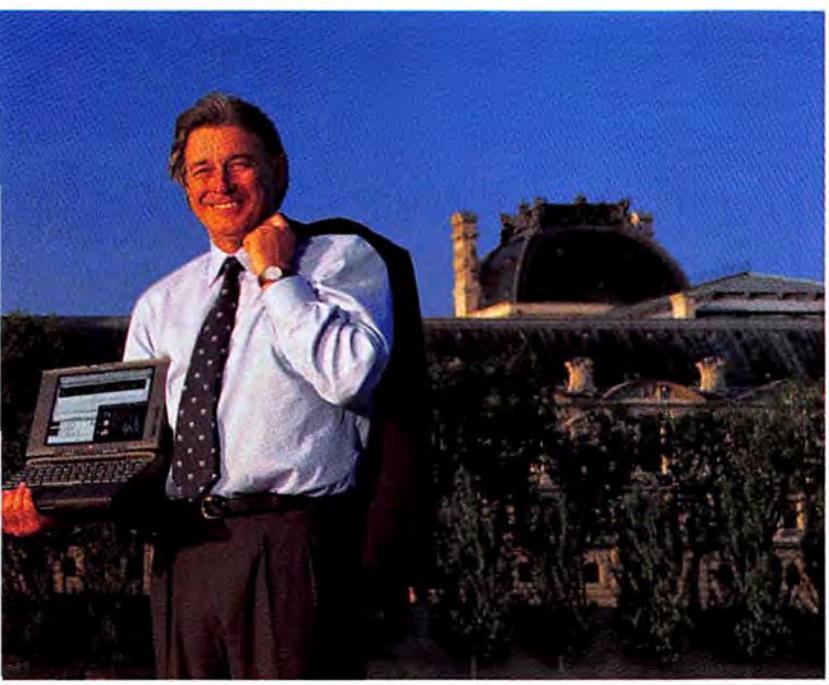
demo and edit a sales video at 30,000 feet.

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Does the Macintosh Still Reign Supreme in DTP? The Publishing Face-Off

BY STEVE ROTH AND OLAV MARTIN KVERN

Get over it. Windows 95 is here, and it's way too big to ignore.

By the time you read this, only a few months after its release, Windows 95 will have more users than the 12-year-old Macintosh. ◆ With that in mind, *Macworld* set out to determine which platform, if either, is superior. We compared overall usability to see how much of a threat Microsoft's latest graphical interface is to Apple's long-recognized ease of use (see "Is the Mac Still the Easiest to Use?" elsewhere in this issue). We compare Mac and Windows 95 in the area where the Mac is most firmly established: the graphics and publishing market. And we ask, Is the Mac's historical stronghold safe? What does the future hold for Macintosh-using publishers? Will Apple retain their loyalty? Or should you be thinking about making a switch? ◆ The short answer is, you don't need to switch. The long an-

JEFFREY PELO

swer is more complex. Users concerned with long-document automation, and those for whom price is the most important decision point, should think seriously about using Windows. For the huge majority of desktop publishers, however, the Mac's many compelling advantages heavily outweigh Windows' lead in price/performance and automation.

As soon as Microsoft announced the features of Windows 95, Macintosh users pointed out that many of the new Windows capabilities were things the Macintosh has had since 1984. We hate to say it, but this argument is irrelevant. We're skeptical about everything, including the Macintosh, and what we really need to know is, does Windows 95 provide anything for the desktop publishing user that the Mac does not? To some extent, the answer to that question depends on what kind of desktop publisher you are.

Desktop Publisher Profiles

If there's one thing we've learned in the years we've spent talking to desktop publishers, it's that there's no such thing as a desktop publisher. There are all different types. Some produce short documents, some long; some use lots of images, some hardly any; and some are font-crazy, while others use the same fonts for years.

The different types of desktop publishers have different system needs. As a kind of shorthand, here is a classification of desktop publishing types. (This scheme is somewhat arbitrary, of course; most users fall into more than one category.)

Laser Level You'll usually find Laser Level types in small printshops or in-house publication departments, producing short documents such as newsletters, flyers, brochures, and small reports. They stick to simple clip art or diagrams, with occasional line art or gray-scale scans; when they print camera-ready pages, they use laser printers. They do occasional spot-color work, but rarely work with process colors or color images.

Design Doctors These are the desktop publishing users whose work wins graphic-design awards. Design Doctors' publications require complex typography, EPS graphics, and scanned images—line art, gray scale, and color. Their publications are an equal mix of one-, two-, and four-color work. Their camera-ready pages are printed on imagesetters.

Image Makers Catalogs, glossy magazines, and other publications that use scanned images and complex EPS graphics are the Image Makers' stock-in-trade. They use process color, with occasional jobs running two, five, six, or seven colors. Like Design Doctors, Image Makers print on imagesetters—they have to.

Bookmakers Long, structured documents such as books, proposals, reports, and technical documentation are the lifeblood of Bookmakers. Their publications contain line art (scanned images and EPS graphics), as well as some gray-scale art, but rarely contain color. Bookmakers spend lots of time working with tables. Their camera-ready artwork usually comes out of a laser printer, but they sometimes print to imagesetters.

With these categories in mind, we can compare Windows and Mac systems to see how the platforms help or hinder these different types of users.

What's in a System?

Desktop publishing is the great integration game—pulling together hundreds or thousands of disparate elements into what you hope is a cohesive whole: your publication. For DTP you need fast processors, fast display systems, big hard drives, all sorts of peripherals, and more varieties of software than we like to think about. And it all needs to work together without constant tending. A system that makes integration easy is a huge boon for desktop publishers, especially those producing complex projects.

We'll cover three major areas in evaluating the two platforms.

- System-level features that are important for desktop publishing, including fonts, printing, color management, and graphic display.
- The software tools available.
- Price/performance ratios.

In all those areas, we ask one big question: Does this aspect of producing publications provide a reason to choose one platform over the other? That is, does Windows or the Mac have the advantage for each type of desktop publisher?

Ease of Use

What about the little things an operating system provides that you need for your publishing projects? Is it as easy to copy a file, open a folder, or switch drives in Windows 95 as on a Macintosh? Yes, it is, with some caveats.

Long file names in Windows 95 actually make the system usable—or they will, once all your applications support them. In fact, Win 95 leapfrogs the Mac's 31-character limit on file names with a 256-character limit, which may be useful for Bookmakers and others whose documents contain many similar elements or go through many revision cycles.

Windows has no file-tagging scheme like the Mac's hidden Type and Creator codes, however, so identifying what a file is—even in Windows 95—means studying those cryptic and limited 3-character file extensions. A file with the extension **.doc** could be a Microsoft Word file (but which version of Word?), or it could be a saved scenario from your favorite shoot-'em-up game. And more to the point, the extension **.pub** can indicate Ventura Publisher documents and Microsoft Publisher documents; double-click on a file with that extension and Windows will launch the most recently installed application that uses the **.pub** extension, even if it's not the right application.

Many other features on the two platforms are quite similar or equivalent, however. Windows' shortcuts are pretty much the same as aliases on the Macintosh (though shortcuts lose their targets much more easily than aliases do). Visual Basic for Applications provides Windows with a system-level scripting language, just as AppleScript does on the Mac. OLE is the method used for interapplication communications in Windows; Apple events does the same thing on the Mac. You get the idea.

That said, we'd also point out that it's far easier in Windows to reach areas that should be marked "still under construction"—something that's practically impossible to do on the Mac, unless you fiddle with programmers' tools such as Apple's ResEdit. With Windows, the guts are just beneath the surface. Some cite it as a Windows advantage that you can get at the underlying Registry or text-based control files, but that fact underscores a Windows disadvantage as well: you'll probably *have* to get at them.

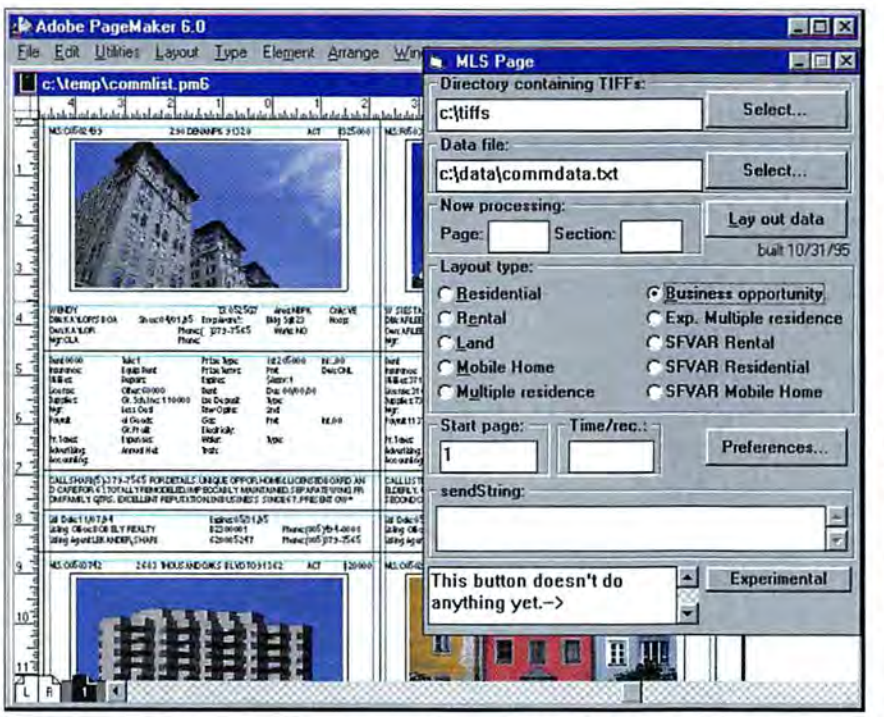
Working with Fonts

On the Mac, whether you're using TrueType or PostScript Type 1 fonts, you just drag them into the Fonts folder and they install themselves, though you have to quit all active applications first, which infuriates us. But two excellent, inexpensive utilities—Suitcase (2.1.4; Symantec, 503/345-3322; $79) and our favorite,

MasterJuggler (1.9.1; Alsoft, 713/353-4090; $69.95)—solve that problem and provide almost all the font handling you could ask for.

We expected Windows 95 to improve on Windows 3.1's font handling, but nothing much has changed. TrueType fonts are now handled via a Registry, which makes things easier for Laser Level users, but there's still no support at all for managing PostScript Type 1 fonts. You can manage fonts with Adobe Type Manager (Windows version 3.0.2; 415/961-4400; $39.95) or the excellent FontMinder (3.0; Ares Software, 415/578-9090; $149.95), which can handle both Type 1 and TrueType, but Windows' font handling still presents several problems.

- Changing printers or font configurations in Windows can affect the spacing of fonts in your publications, so your text reflows. This is no longer a problem with PageMaker (6.0; Adobe; $895) or QuarkXPress (3.31; 303/894-8888; 680X0 Mac and Windows $895; Power Mac $995), which format pages for a printer you specify instead of for the printer selected in the Print Manager, but the problem still rears its head with the less typographically sophisticated programs that Laser Level users favor (see "Windows' Risk of Reflowing Text").
- There are no ligatures (such as fi and fl) in the Windows 95 character set. You have to switch to an expert-set font to find ligatures—if the font vendor has one available for that typeface. This is a royal pain, as it requires that you manually select the ligatures one at a time from the expert set. It also slows down printing. (Neither platform offers ffl, ffi, and other ligatures for sophisticated users as part of the character set.)



Windows Strong on Automation Windows provides automated publishing tools—especially the DDE pipeline for passing commands and data—that have a clear advantage over the Mac's equally capable but slower tools. Here a program written in Visual Basic lays out a complex real-estate listing, including placed images and complex text formatting, in about 30 seconds.

- Tapping the print-speed advantages of manually downloaded fonts requires that you constantly update your font settings by using FontMinder, by manually editing your **win.ini** file, or by deinstalling and then reinstalling fonts with ATM.
- You must install everything in the right order. If you install your printers and printer drivers first, then ATM, and then your Type 1 fonts, you'll be fine—as long as you don't add printers or ports. If you do add a printer or port, you need to use ATM to reload all your fonts so they're added to the list of fonts available for the new printer or port. FontMinder addresses this problem.

On the other hand, applications running under Windows seem to handle large numbers of installed fonts—more than 500—without balking or slowing down, unlike their Mac counterparts.

Seeing Your Work

We hear a great deal of hoopla about the Mac's QuickDraw and Windows' Graphic Device Interface. For the desktop publishing user, it's almost a wash—the two systems are equivalent.

The Mac provides one huge display advantage for desktop publishers, however—the ability to connect more than one monitor, even of different resolutions or color capabilities, and drag items between them as if they were contiguous. You can connect more than one monitor to a Windows machine, but both monitors display the same thing.

Aside from that one significant Mac advantage, the differences have more to do with features of the display system. The Mac offers better calibration and color management, while Windows is way ahead in terms of the cost of fast, high-quality video cards—though video cards for the high-end Macs that feature PCI cost about the same as they do for PCI Windows machines.

Managing Color

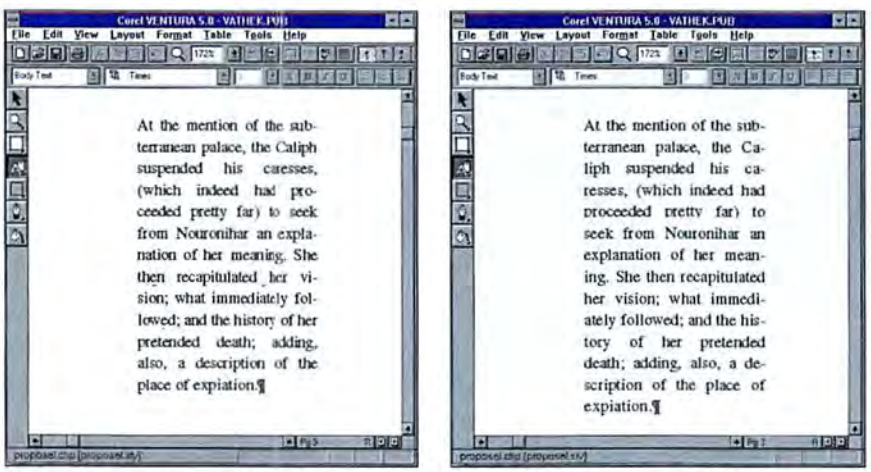
The age of plug-and-play, what-you-see-is-what-you-get color hasn't arrived yet on either platform, but color management—the key to that scenario—is quite a bit further along on the Macintosh. Image Makers and Design Doctors, take note: color management is definitely the future for automated color correction and separation. It's something you want and need, even if you don't know it yet.

PageMaker and QuarkXPress offer color-management systems on both platforms—Quark provides EfiColor, and PageMaker provides Kodak Precision Color Management System, or KPCMS. Both platforms also offer system-level color management—the Mac has ColorSync, and Windows has Image Color Matching (ICM). Both of those systems are based on capable color-management engines—the Mac's ColorSync is based on LinoColor, and Windows' ICM is based on KPCMS (though Kodak says ICM is a less capable and less accurate, or "detuned," version of KPCMS). And both platforms' color-management tools are currently useless for desktop publishers,

because none of the important desktop publishing applications take advantage of them. These programs all handle color and output on their own (PageMaker 6's KPCMS is independent of ICM).

There are also several stand-alone color-management tools on the Mac, generally supporting Adobe Photoshop (3.0.4; $795). Thanks to the Mac's cohesive approach to monitor and display-card support, monitor calibration really does work pretty well. Kodak's ColorMatch and its kin, in particular, offer a beginning-to-end selection of color-management tools available only on the Mac.

Finally, color management is one area where the PowerPC chip really shines—the calculation-intensive job of color management is much faster on the Mac.



Windows' Risk of Reflowing Text Text reflows in Corel Ventura 5.0, like in many Windows applications, when the Windows configuration changes. In this example, a simple change of font configuration—not affecting fonts used in the document—results in reragging and shifts in hyphenation that add a line to the passage.

Printing

If desktop publishing is about anything, it's about printing—getting your brilliant designs out into the real world. In this area, the Mac gets the laurels for ease of use, but Windows wins for speed.

AppleTalk and Ethernet networking are taken for granted on the Mac, as is two-way communication between the Mac and the printer. This makes using a PostScript printer almost transparent—LaserWriter 8.3, the Mac's PostScript driver, can ask the printer what fonts or how much memory it has, for instance, and download the fonts automatically.

ATM and FontMinder can make Windows download fonts automatically for you, but the one-way nature of the parallel printer port on all but the most recent Windows machines prevents printer drivers from querying the printer about what fonts it has installed. So it will blithely download the fonts needed to print your document, even if you've already downloaded them to the printer's RAM or hard disk. To prevent this, you need to update your font configuration every time you download a font or reset your printer.

If you're a Macintosh user, have ATM installed, and print to a non-PostScript printer, your PostScript fonts print as they appear on your screen. Switch to a PostScript printer or imagesetter, and nothing much changes. Under Windows (as we mentioned above), you may see your text shift around in some applications when you switch printers.

At present, Macintosh users have a huge advantage with imagesetting service bureaus. Most bureau operators are Macintosh users, and many service bureaus don't even own a Windows PC; in San Francisco, for instance, only a couple of service bureaus support Windows directly. This will change over time, but for now, service bureaus frequently print Windows files by opening them using the Macintosh version of the program used to create them—often with disastrous results (see "Windows Users Face Service Bureau Problems").

Automating Tasks

Okay, Bookmakers, this one's for you. The area where Windows leads the Mac most resoundingly for desktop publishers is layout automation. Windows offers excellent database-publishing tools not found on the Macintosh, such as InfoPublisher (2.0; Adobe, 800/685-3547; $129), an addition for PageMaker, and Ventura's Database Publisher, which comes with Ventura Publisher. And you can easily roll your own tools using Microsoft Visual Basic.

You can use AppleScript to automate layout processes on the Macintosh, but the Apple events pipeline for sending commands to your page-layout application is slow—very slow—compared with Windows' Dynamic Data Exchange.

Equally important, automation is second nature to people in the Windows world, whereas the topic often elicits a blank stare on the Macintosh side—it's much easier to find a tutor or consultant to help automate your Windows-based database-layout program.

There's one big exception to Windows' lead in publishing automation: there are excellent database-publishing and table-making XTensions for QuarkXPress on the Mac that are unavailable for the Windows version. XData (2.5; Em Software, 614/284-1010; $299) and TableWorks Plus (2.1; Npath Software, 206/392-7745; $299) are two excellent examples. Aside from this significant advantage, though, Windows machines have automated long-document publishing down cold.

The Publishing Tools

One of the main reasons—maybe the main reason—for choosing one platform over the other is the number and quality of programs and utilities available for that platform. Windows has a numeric advantage here, with programs that don't exist and have no equivalents on the Mac. Of the main desktop publishing applications, however, the Windows versions of some are deficient compared with their Mac counterparts. And the number and quality of DTP utilities on the Mac—such as PostScript downloaders and graphics converters—far surpass those available under Windows. Here's a roundup of significant programs and how they compare on the two platforms.

Adobe PageMaker PageMaker version 6 is almost identical on the two platforms, with the exception of some differences in import and export filters. The Power Mac version doesn't demonstrate the same speed increase over the 680X0 version that other Mac programs do,

however, so with the exception of color-management tasks, the Windows version is a noticeably better performer than the Power Mac version running on a price-equivalent machine.

QuarkXPress QuarkXPress for Windows is missing several of the Mac version's features—mainly ones that rely on system-level technologies. There's no scripting, since XPress's is based on AppleScript; no automatic ligature generation (no ligatures in Windows, remember?); and no custom frame generation. Perhaps most important, many of the XTensions available on the Mac aren't available for Windows. And the Power Mac version of XPress really moves; for most tasks, it's faster than the Windows version on price-equivalent machines.

For Design Doctors, Image Makers, and Bookmakers in XPress shops, there's no reasonable choice but the Mac. Laser Level folks will find the Windows version of XPress to be very solid and speedy, but Windows users have less expensive and easier options such as Microsoft Publisher (Windows 95 version 3.0; 206/882-8080; $80) and Serif's PagePlus (3.0; Serif Software, 603/889-8650; $99.95).

Adobe FrameMaker FrameMaker for the Macintosh looks like FrameMaker for Windows (5.0; Adobe Systems, 408/975-6000; $895), which looks like FrameMaker for a variety of Unix systems. This is a great program, but except for its greater speed on Windows, it offers Bookmakers no compelling reason to choose one platform over the other.

Corel Ventura Publisher There was once a Mac version of this impressive long-document program, but Xerox abandoned it before selling Ventura to Corel a few years back. Ventura Publisher (5.0; Corel, 613/728-3733; $347) could be a strong argument for Bookmakers to go with Windows—though it doesn't have FrameMaker's feature set, it has great table editing and is blazingly fast. But while Corel is working on a new Windows version, the current version, 5.0, has some big problems. For example, the floating-frame feature drops all referenced frames at the end of a chapter, and publications reflow when you open them on a machine whose font configuration is not identical to that of the machine you created them on.

ReadySetGo For better or for worse, ReadySetGo GX (7.0; Manhattan Graphics, 914/725-2048; $395) is the also-ran of

Windows Machines Still Cheaper

TO EVALUATE THE PRICE/PERFORMANCE RATIO OF WINDOWS and Macintosh machines, we priced systems equivalent to those we used for performance testing (see the "Price/Performance Ratios" section in the main text). The 8100/80 we used for testing is no longer available, so we priced an 8100/100, which would perform our benchmark tasks considerably faster. Note that we tested on, and priced, a top-dollar Compaq system—with the Mac-clone market still nascent, we hesitated to compare the Mac's pricing with a low-cost Windows clone, but after due reflection, we decided to shop for a less expensive Pentium system with similar performance; for comparison's sake, we also priced a less expensive Mac.

High-End Systems

The Windows Machine

- Compaq DeskPro 5100 mini-tower
- Pentium 100
- 24MB of RAM
- 1GB hard drive
- Matrox Ultima Impression 24-bit accelerated video card
- 15-inch Compaq monitor
- Ethernet

Price: $3302 (direct from Compaq)

Add-ons to make DeskPro 5100 equivalent to Macintosh

- SCSI board $200 (street price)
- SoundBlaster board $169 (from MicroWarehouse)

Total: $3671

The Apple Machine

- Mac 8100/100 (100MHz PowerPC 601)
- 24MB of RAM
- 700MB hard drive

Price: $3337 (from MacZone)

- 15-inch Apple monitor $479 (from MacZone)

Total: $3816

Low-End Systems

The Other Windows Machine

- Gateway 100MHz Pentium
- 16MB of RAM
- 64-bit 2MB DRAM accelerated graphics
- 17-inch monitor
- 1GB hard drive
- 4× CD-ROM drive

Price: $2699 (direct from Gateway; includes Windows 95, Microsoft Office)

With sound and fax: $2899

The Other Apple Machine

- Performa 6220 (75MHz PowerPC 603)
- 16MB of RAM
- 1GB hard drive
- on-board video
- 4X CD-ROM drive
- fax modem

Price: $2499 (from MacZone; includes ClarisWorks, Quicken, American Heritage Dictionary, Grolier Multimedia Encyclopedia, RAM Doubler, Avid's VideoShop)

- NEC MultiSynch XV17 monitor: $800 (from MacZone)

Total: $3299

Mac desktop publishing programs, lacking the widespread support of PageMaker or QuarkXPress. Though ReadySetGo offers some impressive features, it's not a program to base a platform choice on.

More Publishing Tools

Besides the core DTP programs, there are plenty of tools that affect the publisher's work life.

Inexpensive Contenders The Windows-only Serif PagePlus offers a lot of what PageMaker and XPress offer; combined with a cheap 486 box, this program constitutes an incredible bargain for Laser Level users.

Microsoft Publisher has a huge installed base on Windows, but it has been of interest primarily to the very newest or most amateur of the Laser Level set, with so-called page-layout wizards that help the befuddled middle manager put together a reasonable-looking publication in short order. The new version, 3.0, offers a greater number of more-professional tools, including better color handling, especially for spot colors; rotation of all elements; and improved typography. But Publisher still won't woo any Design Doctors away from QuarkXPress.

Then there's Adobe Home Publisher (2.02; $49.99, or $109.99 on CD-ROM). We just detest this program—we're sorry to say that since the disappearance of TimeWorks' Publish-It, Adobe Home Publisher has become the only inexpensive alternative on the Macintosh.

Given the price of entry-level Windows boxes, these low-cost Windows contenders argue strongly for that platform as a better choice for Laser Level users.

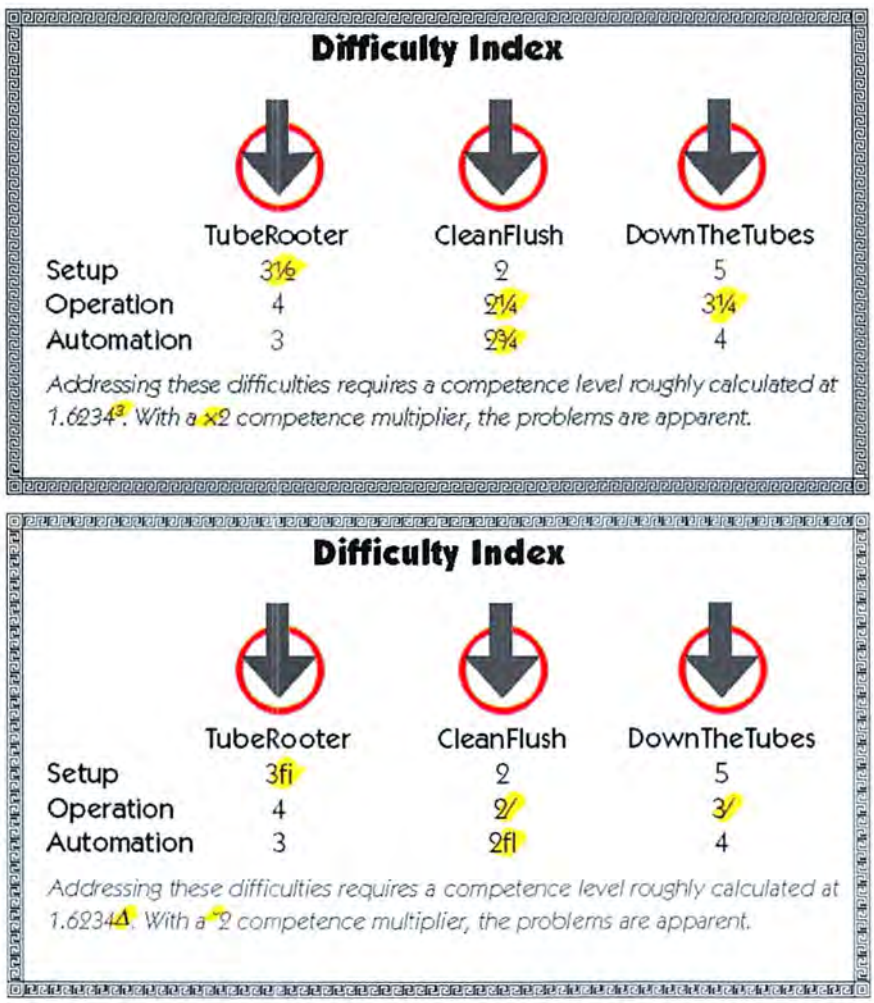
Image-Editing Programs There are many image-processing programs out there, but Adobe Photoshop (3.04; $895) is the 800-pound gorilla in the category—the one that Image Makers live and die by. While its feature set is basically identical on the two platforms, its performance of key tasks such as sharpening and color separation on Power Macs simply blows Windows away. If you move lots of images, you probably use Photoshop, and you shouldn't be using it on anything but a Power Mac, especially since you can also use Live Picture (2.1; MetaTools [formerly HSC Software], 805/566-6699; $595), DeBabelizer Toolbox (1.6.5; Equilibrium Software, 415/332-4343; $399), and other image-editing programs that aren't available under Windows.

Illustration Programs The three big draw applications—Macromedia FreeHand (5.0; Macromedia, 415/252-2000; $595), Adobe Illustrator (Mac 5.5, Windows 4.1; $695), and CorelDraw (Corel, 613/728-8200; price ranges from $69 to $627 depending on version)—constitute a mixed bag. The Macintosh and Windows versions of FreeHand are nearly identical. By contrast, Adobe is up to version 5.5 of Illustrator for the Mac; the current Windows version, 4.1, lacks gradients, layer support, PostScript on the Clipboard, the ability to work in Preview mode, plug-in filters, multiple undos, tool and control palettes, and interactive cursors—to specify just a few minor features. If you're an Illustrator user, you're far better off with a Macintosh.

As for CorelDraw, the first question is, which CorelDraw? People are still using—*and Corel is still selling*—versions 3, 4, 5, *and 6*. This Windows-only program is incredibly feature-laden, though not all the features work all the time, and it comes with everything but the kitchen sink: an image editor, an image-cataloging application, thousands of fonts, tens of thousands of pieces of clip art, and so on. The CorelDraw bundle is a strong argument in favor of Windows for Laser Level folks, though Design Doctors and Image Makers may find Corel sluggish and not well designed for production use.

Price/Performance Ratios

All the test results we've seen comparing Mac and Windows performance, includ-



Windows Users Face Service Bureau Problems Service bureaus are so Mac-oriented that many output Windows jobs using Mac applications. Whichever platform is to blame, this can spell trouble for Windows users. QuarkXPress manages the cross-platform translation better than most, but even it can't compensate for everything that could go wrong. Shown here: a Windows XPress file (top) converted to Mac XPress (bottom). Compare the highlighted characters.

ing ours, tell the same story: you can get equivalent performance for most desktop publishing tasks for several hundred dollars less on a Windows box.

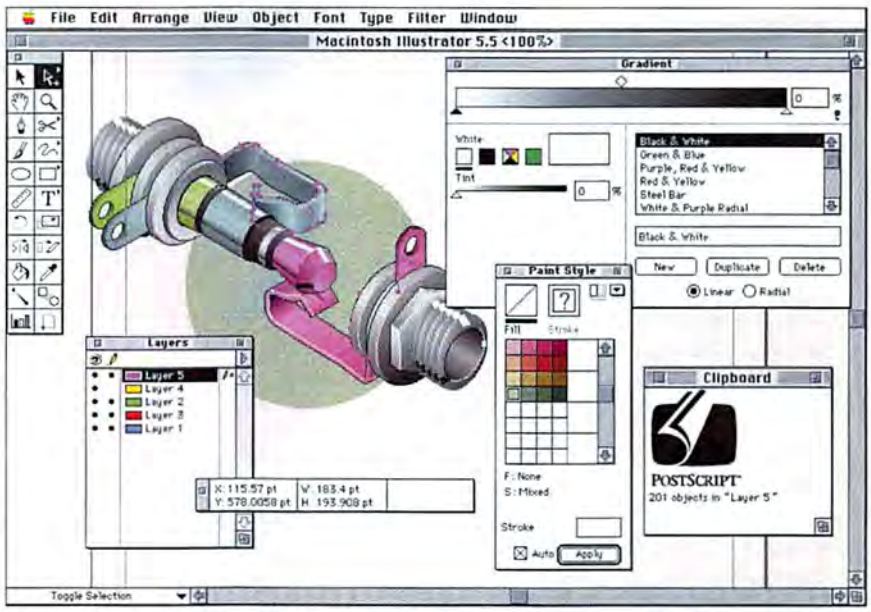
Plus, a 66MHz 486 running PageMaker or QuarkXPress just plain *feels* faster than a 68040-based Macintosh. On a 120MHz Pentium, these programs really blaze. There are two main reasons for this difference. First, Windows machines' IDE drive controllers and fast drives, combined with Windows' simplistic file system, make for blazing disk access—seemingly RAM-like speeds in some situations. Second, because accelerated video cards are hundreds of dollars cheaper for Windows machines, most Windows users have access to them; on the Macintosh, these cards remain a tool of specialists.

For Laser Level folks, who tend to buy the inexpensive boxes where the price differential is largest—and who are especially price-sensitive—the difference in cost can be significant. For Bookmakers, Image Makers, and Design Doctors, who buy more-expensive machines, the price spread is less and the timesaving advantages that all Macs offer can easily outweigh the price differential. Beyond that, Power Macs in particular offer superior performance in several frequently performed and very time-consuming functions that are the bane of the professional desktop publisher—though Windows 95 systems are much faster in certain occasionally performed tasks.

For example, we compared a Power Mac 8100/80 CPU, which is driven by an 80MHz 601 CPU, against a Compaq DeskPro 5100 with a 100MHz Pentium. To test screen-redraw performance, we zoomed a color- and graphics-laden QuarkXPress 3.31 file to Fit in Window; the Power Mac performed that task 1.8 times as fast as the Pentium box, a decisive advantage for an unavoidable event that occurs constantly while laying out pages. On the same systems, the Power Mac was 1.4 times as fast at sharpening a 5MB Photoshop file and converting it to CMYK, a grueling, repetitive process that every production Design Doctor and Image Maker faces.

Those two tasks rely heavily on raw processing speed, where the PowerPC chip has a significant advantage over the Pentium. Weaknesses in the Mac's System 7.5 compared with Windows 95, however, give the Pentium much better performance on several tests that depend on disk input/output and PostScript drivers. For example, the Compaq was more than 3 times as fast at autoflowing text into PageMaker 6.0, a task usually performed once at the beginning of a project. When saving an image-laden QuarkXPress document to a PostScript file, usually the last step before heading for the service bureau, the Pentium box was a humiliating 14 times as fast as the Power Mac, though it was only 1.2 times as fast at performing the same task on a text-only PageMaker file.

In other words, for those who rely on floating-point performance—not only for color separations, but also for color management, 3-D rendering, and so on—Power Macs smoke the competition.



The Mac's Illustration Power The Mac's version 5.5 of Illustrator is a generation ahead of its Windows version 4.1 counterpart. This illustration shows some 5.5 features that are not available in 4.1, including sophisticated gradient controls, palettes for tools and controls, and the ability to work in Preview mode.

The Last Word

There are three essential questions to ask when comparing Macs with Windows machines for desktop publishing.

- Does the platform offer the facilities I need to do my job efficiently? Windows' lack of two-way printer communication, inability to drive multiple monitors, clunky support for Type 1 fonts, lack of ligatures, less-capable color management, and limited service-bureau support all combine to say no for advanced desktop publishers. The Macintosh is far from perfect and its automation tools are slow, but all of those other pieces are in place.
- Does the platform have the depth of programs and utilities that I need? Again, despite the numerical advantage on the Windows side, the tools for advanced desktop publishers are not as good (with a couple of exceptions). However, for good, inexpensive DTP programs, the Macintosh really has nothing to offer.
- Can the platform provide the performance I need at a price I'm willing to pay? Except in image processing and 3-D work, where the Power Macs reign supreme, you can get more for your money from a Windows machine, especially for the less powerful systems.

So, should you, a Macintosh user, switch? Unless a particular Windows program or feature heavily overrides all the other advantages, no. But when you get into faster machines, the difference in price begins to narrow.

Will you have to switch? No, not this year, and probably not in 1997. But beyond that, our crystal ball is looking pretty cloudy. **m**

OLAV MARTIN KVERN is the author of *Real World FreeHand* and coauthor of *Real World PageMaker* (both Peachpit Press, 1996). *Macworld* contributing editor STEVE ROTH is the editor of *Real World Photoshop 3* (Peachpit Press, 1996).

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Source: Contingency Planning



Source: Bell Laboratories

Power problems are the leading cause of computer data loss, while the most frequent type of power problems are undervoltages and blackouts, which surge suppressors alone are powerless to protect against.

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Modern Press President Stephen Hopkins explains, "I protect my Mac Performa with a Back-UPS 400 and the unit works great. The Mac handles all bookkeeping, administrative and estimating functions for the company. It is a critical piece of my business. Unfortunately, we are located in an industrial park... a nice way of saying that our power fluctuates a great deal. After five years of reliable performance from my Back-UPS, power problems are no longer my concern. I can focus my energy on my business instead."



At Cellophane Square, Seattle's best known independent and alternative rock record store, Steve Marcus, Product Buyer, counts on APC to keep his Mac II SI and POS terminals running reliably. "The building where we started out was ancient and full of power problems. I lost lots of purchasing and product related information... until we invested in APC. I chose APC because they offer the most reliable product. I haven't been proven wrong yet. Problems continued in the building, but they were no longer a problem for us."



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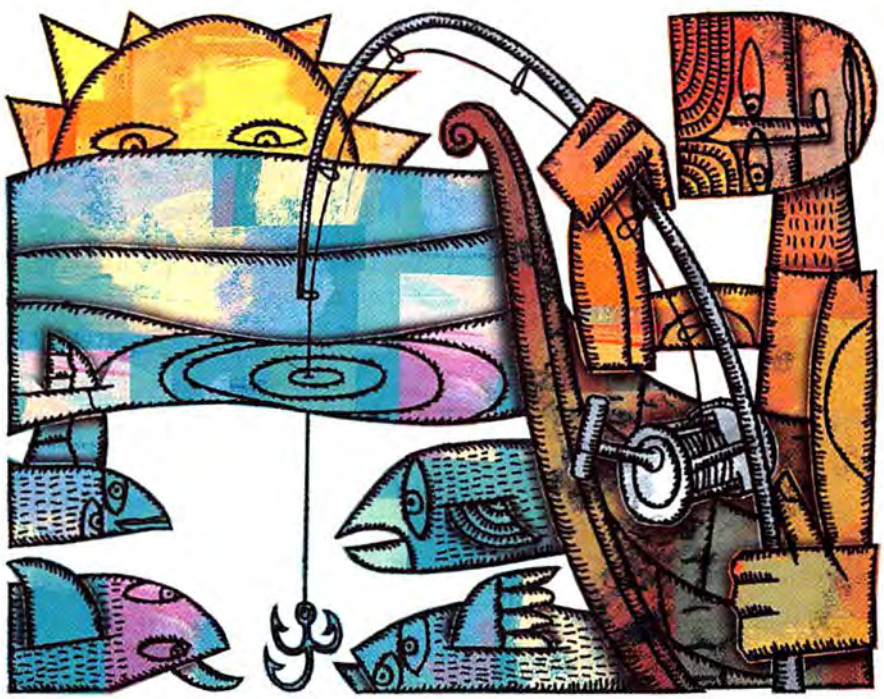
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Secrets

Secrets of the Find File Command

A GUIDE TO FASTER, MORE POWERFUL FILE SEARCHES

by Joseph Schorr



The Find File command—a standard part of System 7.5—is one of the slickest file-management utilities available for the Mac—and it's brimming with secrets. Unlike the somewhat lame Find command in previous versions of System 7, Find File (now a standalone application) allows you to search for files by multiple criteria and sort, move, copy, or make aliases of hundreds of files at a time. You can even track down missing files by searching their contents or their hidden type and creator codes. Here's a collection of Find File features and techniques—some of them completely undocumented—to make it quicker and easier to manage your files.

Multiple, Simultaneous Searches

Let's say you have to perform two separate searches—you need to find all the Claris FileMaker Pro documents on your file server created within the last month, but you also have to locate the last six weeks' worth of Microsoft Excel documents on your own hard drive that have the word *budget* in the name. It's possible to perform both searches at the same time using duplicate copies of Find File, located in the Apple Menu Items folder, in the System Folder. In fact, you can create as many copies of Find File as you want, renaming them as you please.

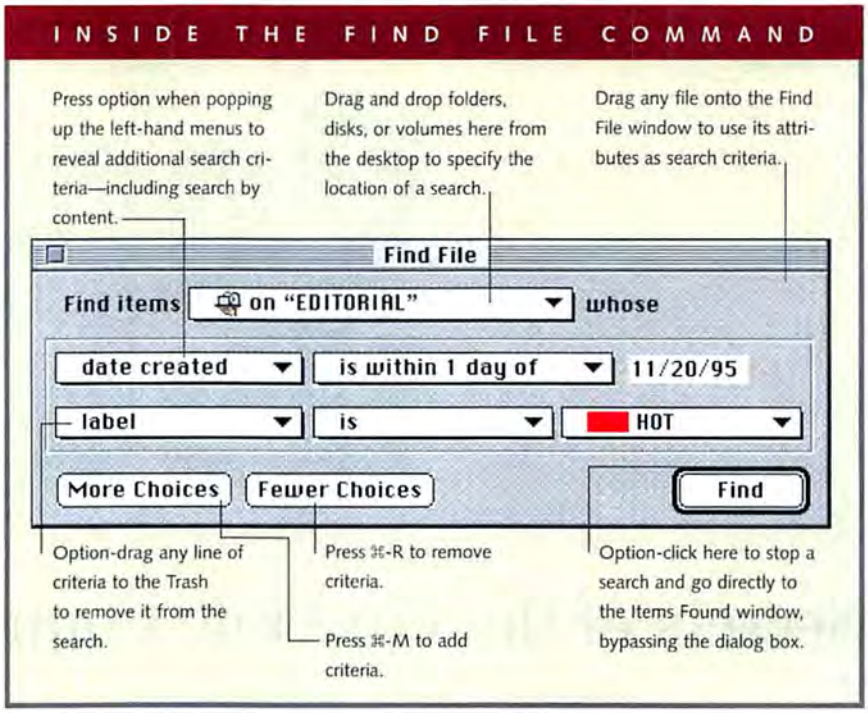
To run simultaneous searches, first set up and activate one search, then launch a copy of Find File and proceed with the second search. Your Mac will process both searches simultaneously. When the searches are complete, each copy of Find File will display the results in a separate Items Found window.

You can also run multiple simultaneous searches, without duplicating the Find File application, by using ⌘-shift-F to activate the pre–System 7.5 Find command. (This command is still embedded within the Mac's system software, oddly enough.) You can perform a complex and lengthy search using the Find File application (use ⌘-F or choose Find File from the Apple menu) and then—while the Mac cranks away on that job—perform a second search with the old Find command. The old command is less powerful than the new, but it still lets you search for files based on up to nine criteria.

Print Out Your Findings

Say you want a list of documents stored on your file server that are more than six months old. Find File makes it easy to zero in on those files (and folders) by

continues



date, kind, and location; less obvious is how to get a printed report of that information once you've gathered it. Find File actually generates three types of reports.

The most basic is a simple paragraph-delimited list of file and folder names. To create such a list, use ⌘-A to select all the items that appear in the Items Found window, then copy and paste the selection into a word processor document—or even a Stickies note. You'll get a clean, complete list of found files and folders. (This method works in Finder windows, too, but you're limited to 256 characters of file information when copying and pasting in the Finder.)

Want a report with more information about each file and folder? Select the icons in the Items Found window and drag them into a Stickies note or into any word processing program that supports Mac drag and drop (such as SimpleText). You get a tab-delimited report listing the modification date and time, and for files the name, size, and kind as well.

For a more technical report, hold down the option key while dragging the icons as described above. The resulting tab-delimited report shows each file's type code, creator code, and label, plus the size and modification date and time.

Find File's Secret Message

Like many other components of System 7.5, the Find File utility has a few secret messages and hidden surprises that its programmers buried within the code. Here's one worth checking out. Open a copy of Find File with ResEdit and double-click on the DATA resource icon. Inside, you'll find just one resource, ID #0. Open it and scroll through the hexadecimal code to find the programmer's secret message in the right-hand column (For those of you who don't have ResEdit, turn this page upside down.)

„I liked vacuum tubes better."

Content Searches—Pros and Cons

When you're desperate to find a file and all else fails, use the Find File command to search based on the file's contents, seeking out a specified text string within a file. Searching by content is a hidden feature of the Find File program that you must unlock. Hold down the option key when you click on the first search-criteria pop-up menu, and four additional criteria appear on the menu. Choose Contents from the pop-up menu and enter the text string you want to target.

Searching by content is powerful, but it can take a very long time; your Mac has to examine all the text in all your files to find matches. Remember, though, that it can operate in the background, so you don't have to idly stare at the screen while the search proceeds. Activate the search, then switch to your other work. Find File quietly performs its mission in the background and provides the results in the Items Found window when done.

A techy note: When you search by content, Find File doesn't poke its head into every file on your hard drive. It ignores 20 types of files, including all applications, so that strings of programming code, text from dialog boxes, menus, and help files don't show up in the results of your searches.

An Extra Handful of Find File Tips

If you stop a search in progress by clicking on Stop or pressing ⌘-period, a dialog box asks if you want to display the items Find File has found so far. Option-clicking on Stop bypasses that step, taking you right to the Items Found window.

You can sort files in the Items Found window by name, size, kind, or date by clicking on the appropriate category header—just as you can in Finder windows. But Find File adds a unique twist—option-clicking on any of these headers sorts the items in reverse order.

Instead of using the More Choices and Fewer Choices buttons, you can press ⌘-M and ⌘-R to add or remove criteria from a search. To remove a search option sandwiched between two others, option-drag it to the Trash.

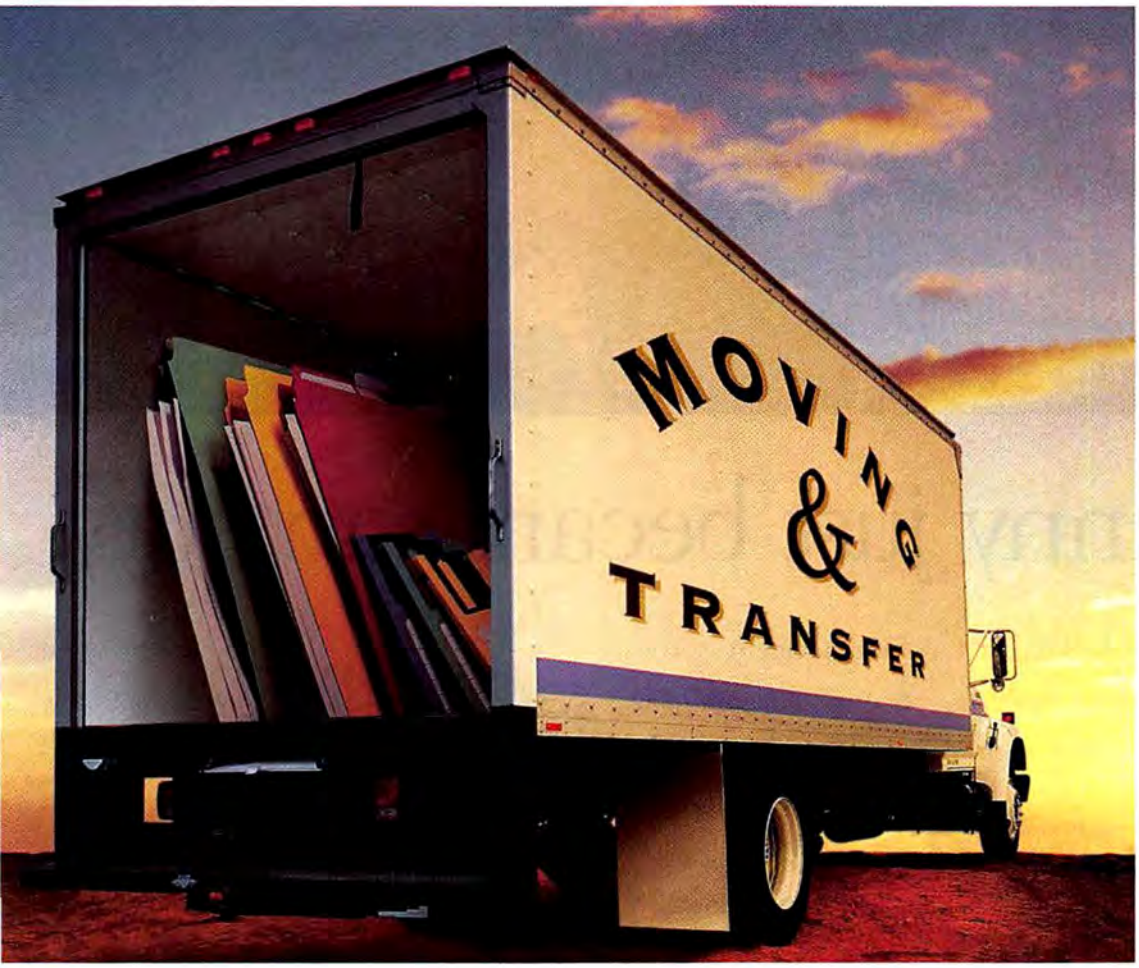
To create a new alias of a found item, ⌘-drag it from the Items Found window.

Option-drag an item from the Items Found window to make a copy of it. (This feature is supported in System 7.5.1 but not in the original 7.5 release.)

If your search turns up hundreds of files, you'll probably get a message midway saying Find File doesn't have enough memory to find any more items. In that case, try increasing the program's memory allocation from its default 280K to at least 1MB or 2MB. (To do this, select the Find File icon in the Finder, choose Get Info from the File menu, and type the new memory allocation in the Preferred Size field.) Now Find File will be able to find, sort, and display hundreds more items in each search. **m**

Contributing editor JOSEPH SCHORR is co-author of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

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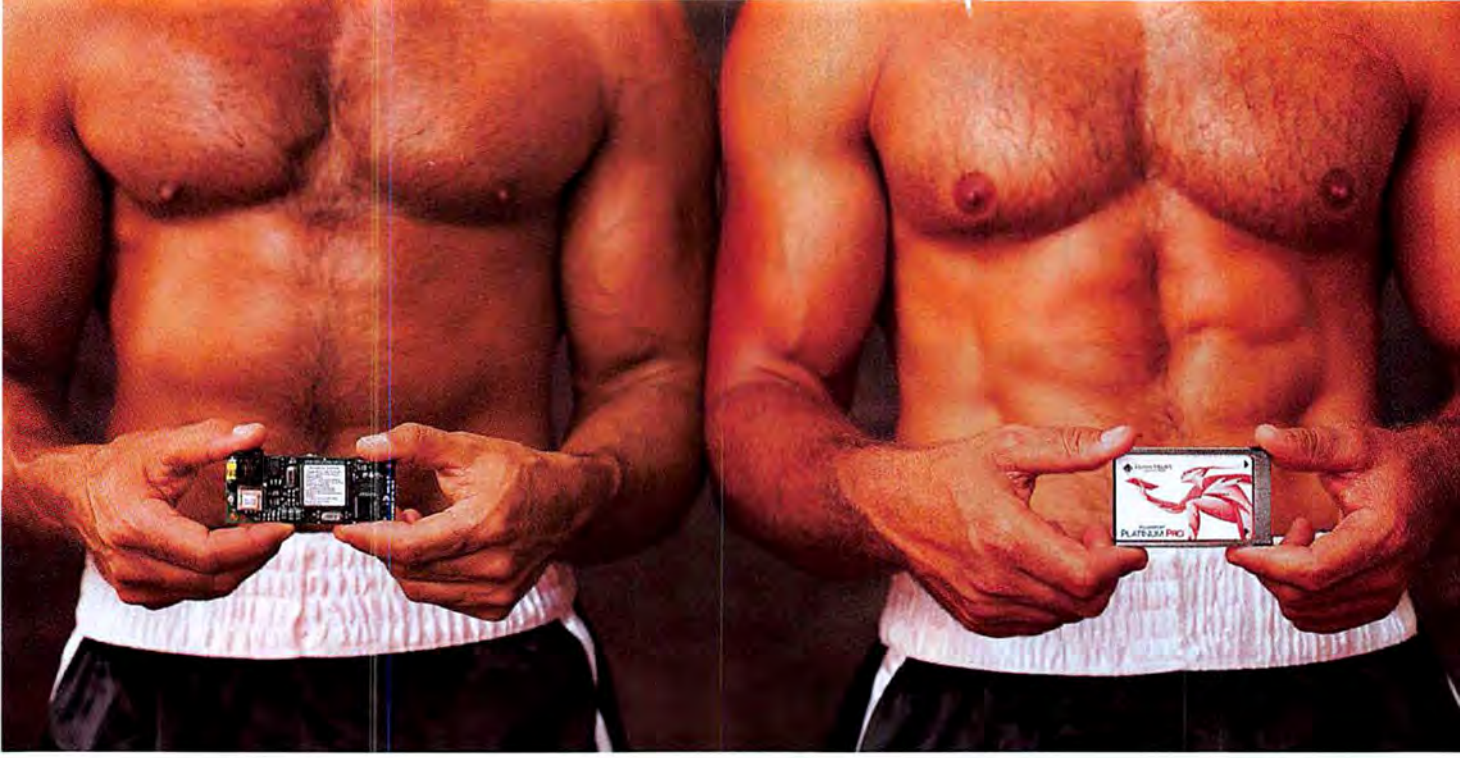
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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

Tell the truth: when did you last even think about a RAM disk, let alone mount one on your desktop? Mark D. Wiggins of Niantic, Connecticut, has found an everyday use for a RAM disk. He speeds up surfing the Internet's World Wide Web with Netscape Navigator by putting its disk cache on a relatively small RAM disk. He finds this makes paging back much quicker, greatly reduces the number of hard disk accesses, and makes cache cleaning and deleting almost instantaneous. To get set up, use System 7's Memory control panel to create a RAM disk of about 1MB. After restarting to mount the RAM disk, use Netscape's Preferences command to set the Cache Directory option to the RAM disk. Note that the memory you allocate to a System 7 RAM disk is reported as part of the system software by the Finder's About This Macintosh command.

To reclaim that memory, you must turn off System 7's RAM disk feature and restart your computer. You can avoid that hassle by creating a RAM disk with the $15 shareware program AppDisk 1.61 or the freeware program Faster App (available on the World Wide Web at **http://www.macworld.com** and on America Online by specifying the keyword **Macworld**). Both create a RAM disk as an application (sounds weird, but it's true), and you get your memory back as soon as you quit or drag the RAM disk icon to the Trash. Those solutions, as well as the $35 shareware control panel RamDisk+ 3.2.4 (available on the Web and on America Online; see above) and the commercial program Maxima from Connectix, also work on old Macs that can't use System 7's RAM disk feature.

An Expensive Loose Screw

If the screen on your 500-series PowerBook feels loose when you open and close it, waste no time in tightening the four screws that hold the screen in place. Disaster struck one *Macworld* editor a month after he first noticed about an inch of free play each time he opened or closed his 540c. Just after his warranty expired, uneven distribution of stress from loose screws caused the small plastic post that held one of the screws in place to snap off. There's no way to replace just the post,



and replacing a perfectly good screen would have set him back a whopping $1300. The screen still works, but if he moves it even slightly, it flops backward against his desk. After hearing about this incident, another *Macworld* editor checked his 540c and found the screws attaching his screen also coming loose. So check the screws on your 500-series PowerBook frequently, and tighten them if they're loose—but take care not to overtighten them or you risk stripping or cracking the posts.

Disabling Screen Snapshots

Q As our high school's computer administrator, I'm constantly struggling to keep students from tampering with a computer's desktop, since I often have to spend a lot of time restoring the computer so it's usable again for others. For example, the Mac's famous screen snapshot capability (⌘-shift-3), if used continuously, can fill up a hard drive in no time. If I use ResEdit to remove FKEY resource 3 from the System file, will that disable the screen snapshot capability?

MIKE TRUDNOWSKI
Missoula, Montana

A Yes, you can disable this capability by removing FKEY resource 3, or by replacing it with a different FKEY resource such as the Beep FKEY available from Macworld Online (if you do replace it, use ResEdit's Get Resource Info command to set the replacement FKEY's ID number to 3). If you want to enable and disable FKEYs by dragging Finder icons, use ResEdit to put the FKEY resources in one or more font suitcases that contain no fonts or other resources. Drag a suitcase in or out of the Fonts folder to enable or disable the FKEYs in it.

If you really want to give the smirking wise guys fits, install Apple's At Ease 3.0 software. Besides optionally disabling screen snapshots, it can be configured to let users work in the Finder while restricting their use of floppy disks and CD-ROMs, limiting each user to accessing only items in two folders, preventing changes to other files (including those in the System Folder), stopping unauthorized use of applications, and more.

continues



Not Identical Twins How can the same System Folder be 10MB smaller on a Zip disk than on an internal hard drive? The larger the drive, the bigger the allocation blocks it uses to store files—which can add up to a lot of wasted space.

Folder Size Disparity

Q Why does the 86MB System Folder on my Power Mac 8100's internal hard drive shrink to a mere 76MB when I copy it to a Zip disk (see "Not Identical Twins")?

DON CONDIE
Boston, Massachusetts

A The Mac OS allocates disk space in bigger chunks (allocation blocks) on large disks than on small ones. Each file on a disk occupies one or more allocation blocks; the exact number depends on the file size and the disk's allocation block size. On a 96MB Zip disk, the allocation block size is just 1.5K, but 8.5K on a 520MB disk and 16.5K on a 1040MB disk. Regardless of the allocation block size, the last block is only partly full in most files. For example, a typical alias file that contains 700 to 800 bytes wastes about 1K on a Zip disk and wastes about 16K on a 1GB disk. (In the Mac OS 7.5 and later, the Finder rounds file sizes up to the nearest whole number.) Many Mac files waste even more space because they have two parts (called forks)—one for data and one for resources—and the Mac OS allocates space to each one separately. For example, a SimpleText document always occupies at least 3K on a Zip disk or 31K on a 1GB disk. The aggregate unused space in all 998 files in your System Folder accounts for the 10MB size discrepancy on the two disks.

The waste of disk space on big hard drives happens because the disk allocation method used by today's Mac OS was devised when typical hard drive capacity was 10MB or 20MB, and guess what? The method doesn't scale elegantly to drives 50 times larger. You can reduce the waste by partitioning your big hard drive into multiple volumes. For example, a small preference file that takes 16.5K on a 1GB hard drive would take only 4K on a 250MB partition, saving 12.5K. If you work mostly with large files, though, large volumes are more efficient. A number of utilities can partition SCSI hard drives, including FWB Hard Disk Toolkit, Casa Blanca Works' Drive7, CharisMac Engineering's Anubis, and MacPeak's RapidTrak and RapidTrakPD.

Obtaining Apple Software

Q After fixing a problem with the hard drive on my Quadra 605, I reinstalled everything except the StyleWriter II printer driver software, which I can't find. How can I get a new copy of this driver without buying System 7.5, Apple's only solution?

MILTON WILNER
Long Island City, New York

A Apple's printer drivers and a lot of other system and utility software are available by modem from Apple's software update library on eWorld (shortcut: **support**) and on the Internet (on the Web page, **http://www.support.apple.com/wwwdocs/apple_sw_updates.html** and the FTP servers, **ftp.info.apple.com/Apple.Support.Area/** and **ftp.support.apple.com/pub/**). You have a choice of using either the StyleWriter II driver or the newer StyleWriter 1200 driver. The latter takes up about 500K more disk space, but features watermarks, thumbnails, a new scale factor of 200 percent, and new halftoning methods. The instructions say to install the Color StyleWriter 2400 driver first, but you don't have to unless you want the included collection of watermarks or the desktop printing software (the same software you get with LaserWriter 8.3, as described in *Quick Tips*, October 1995, and *Quick Tips*, December 1995). You certainly don't need to keep the Color StyleWriter 2400 extension, and you may not need ColorSync and the other items installed along with it.

You can get detailed information about Apple's software update library by sending an E-mail message that contains the appropriate subject heading to **info@thing2.apple.info.com**. For example, to receive an alphabetical list of the library contents, enter **swalpha** in the subject line. To get a structural list of the library contents, enter **swstructure**. For a list of what's new, enter **swnew**. For a current listing of where to find Apple software updates, enter **swwhere**.

Periodic Cell Change

TIP Suppose you want to have a spreadsheet automatically change a cell value each week, month, or at some other regularly recurring time. You could use a macro that executes automatically, but that would require a working knowledge of Visual Basic or the Excel 4.0 macro language. A simpler solution is to use a formula like one of those shown in "Weekly Increment."

SHANE DEVENSHIRE
Walnut Creek, California

continues

	A	B	C	D
1	Current Value	Amount to Add	Start Date	Formula for "Current Value"
2				
3	246	13	7/12/95	=12*B2+INT((NOW()-C2)/7)
4				
5	246	n/a	n/a	=12*13+INT((NOW()-("7/12/95"))/7)
6				

Weekly Increment Both of the Excel formulas shown here add an amount to cell A1 every week, but either could easily be modified to add the amount at a different interval simply by substituting the number of days for the 7 at the end of the formula. Cell A5's formula, which is displayed in cell D5, includes the actual values for the start date and the amount to add at each interval. The formula displayed in D3 (which also works in ClarisWorks) gets those values from cells B3 and C3. Although this makes the spreadsheet somewhat more complex, it also makes the formula more flexible.















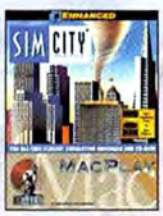
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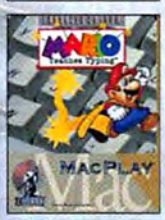
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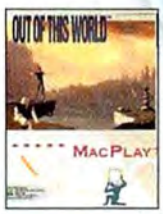






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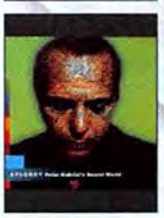






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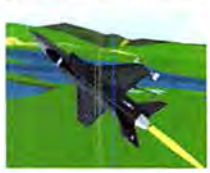
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URL Info If you use Netscape 1.1N or a later version to save a Web page as a file, you can look up the Web page's URL by using the Finder's Get Info command on the saved file.

Web Registration

TIP Many World Wide Web sites on the Internet now require you to register before you can access some or all of a site's content. To avoid compromising the security of restricted Web sites, you shouldn't register the same user name and password with multiple sites—yeah, right. Trying to keep track of a different user name and password for each Web site can be a real pain, so I store whatever user name and password I've chosen for a particular site in the Description box of Netscape Navigator's View Bookmarks window. When I visit a site that requires a log-in, I just bring up that window and read the necessary info there. This method isn't secure if many people use your Mac, but it works great if you are the only one with access.

GORDON HAWLEY
Ventura, California

Myst Transport

TIP Are you stuck in a Myst age? You can go to any age by pressing ⌘-slash (/) to bring up a standard Open dialog box. Ignore the prompt in this dialog box, which asks you where HyperCard Help is; instead, open the folder named Myst Files. You'll see the names of all the Myst ages, and double-clicking one transports you to it with a slight delay.

DEREK COLE
Porterville, California

Forgotten URL

TIP Have you ever saved a Web page as a file and later needed to know what that page's URL was? Netscape 1.1N and later versions store the URL as file comments you can read with the Finder's Get Info command (see "URL Info"). Of course, Get Info comments are generally wiped out if you rebuild your desktop files, so the URL may have a limited life span.

GEORGE PYTLIK
Delta, British Columbia, Canada

Get Info comments disappear when you send a file as an E-mail attachment. Furthermore, I've also noticed that Speed Copy 1.0.2 (one of the Speed Doubler trio of extensions from Connectix) does not copy a file's Get Info comments along with its content.—L.P.

Canceling Restart or Shut Down

TIP Have you ever chosen the Restart or Shut Down command and then remembered that you needed to do a thing or two more? You can cancel those commands if you have a screen saver with sleep corners, such as After Dark. If you choose Restart or Shut Down accidentally, quickly slide the pointer to the screen saver's sleep-now corner. The screen saver kicks in and effectively cancels the chosen command. You have more time to get the pointer into the corner if you have an application or two open at the time.

JAMES JUNG
Hacienda Heights, California

Alternatively, use the screen saver's sleep-now hot key.—L.P. m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).



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Bandwidth Blues

by Matthew Hawn

Anyone who's ever been online knows the drill: click and wait. And wait. It's the bane of any cybernaut—the Internet is an astonishing place to visit, but just to get online often involves surviving an interminable wait in line. What causes these delays? Read on.

Bandwidth and the Bard

Often bandwidth is compared to a pipeline, but to get more technical, the term signifies the maximum theoretical capacity of a given communications channel (cable, radio transmitter, satellite dish, and so on) to transmit digital data. Currently that channel is the wiring that connects your computer to a data source such as a Web server or a commercial online service.

Consider a page of text from Shakespeare's *Hamlet*, for instance, consisting of approximately 14,000 bits, or 14 kilobits (Kbits). Theoretically, a 14.4-Kbits-per-second (Kbps) modem is capable, under ideal conditions, of sending or receiving that page of *Hamlet* in just under a second. A standard Ethernet connection, by contrast, has a bandwidth of 10,000 Kbps, theoretically capable of sending seven copies of the entire text of *Hamlet* in one second under optimal conditions.

But as any experienced modem jockey will attest, in practice you rarely encounter optimal conditions. Identifying the bottlenecks is far from straightforward, but one culprit that you can almost always rule out is your Macintosh. Even the least expensive Mac can move data around faster than just about any wire. The slowdown is almost always caused by factors outside your Macintosh that are constraining your functional bandwidth.



Analog Woes

Mediocre connections via modem are the most common bit-bogs. Because your modem relies on an analog signal (waves rather than bits) over copper wire, that line is subject to static, line noise, and weakened signals. You've experienced this annoying problem if you've ever gotten a bad telephone connection—voices crackle, pop, and drop out.

In conversation, you hardly notice the gaps; you intelligently fill them in automatically based on context. But line noise of that sort can wreak havoc with data. To get around the problem, your modem senses interference and automatically negotiates a speed level that provides the most reliable data transfer. Therefore a 209K sound bite of William Shatner reciting a Hamlet soliloquy that should download in 72 seconds using a 28.8-Kbps modem's optimal bandwidth might reasonably be expected to arrive in 87 seconds if, for instance, that modem slows down to a 24-Kbps transfer rate.

If you use a commercial service to connect to the Internet, things get even more complicated as your data requests get detoured first through the service's host computers for translation to the correct Internet protocols and then shunted on to the Web site you want to browse. During the peak hours of 6 p.m. to midnight, you may experience some serious delays. Your best solution is to log in during lower usage hours: either late at night or early on weekends.

Currently, most local Internet service providers (ISPs) give you better performance than you get from the commercial services (see "Make the Right Connection," October 1995). But in the next few months, expect the commercial services to offer a faster, direct modem connection via Internet-centric services that use the Internet protocols. They will compete with the smaller ISPs but will probably cost a little more.

Digital Throes

Direct digital connections provide much higher bandwidth, better stability, and virtually no noise. If you use a direct digital connection, there are no analog phantoms to slow down or halt the

continues

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transfer of a 44K JPEG image of an oil painting of a scene from *Hamlet*.

With the introduction of leased digital ISDN (Integrated Services Digital Network) lines, 56-Kbps and even 128-Kbps connections are possible if you can afford to upgrade with ISDN hardware and the setup fees for these special lines. This is a solution aimed at serious telecommuters and small businesses that want to connect to the Net. It's not at the plug-and-play stage yet, but transferring that 44K image file via a single ISDN channel would take less than a second. Dual-channel ISDN is available in some areas; with the right hardware, you can use both channels simultaneously to send data, doubling your speed.

Many larger companies and Web providers are opting for the quicksilver conduit known as a T1 connection. A network connected to a

Bandwidth: The Bane of the Danes

At noon in Elsinore, no one gets optimum bandwidth. With everyone surfing the Web at lunchtime, the main culprit is the general fog of network traffic. But some other common bottlenecks plague each of these users, making data transfer rotten in Denmark.

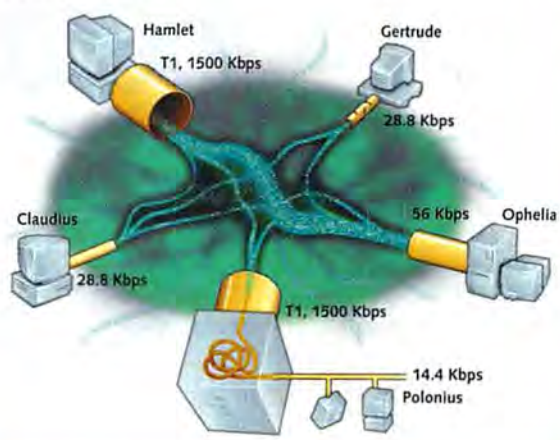
Hamlet set up his Web site with a personal T1 line connection—good for 1500 Kbps. He gets few visitors to his site, and he has bandwidth to spare. Even so, when he browses Ophelia's site, he's slowed by the heavy traffic passing through her 56K line.

Ophelia's remarkably popular Web site uses a dedicated digital 56K ISDN connection. The steady stream of visitors to her own site slows her down when she goes out to browse Hamlet's gloomy poetry.

Claudius has a new 28.8 modem and a dependable service provider. But today while he's visiting Ophelia's site, the heavy load on her ISDN line takes a toll on his access.

Gertrude's 28.8 modem never cruises at full speed. Thanks to the castle's lousy phone wiring, she gets a noisy connection to her service provider. At best, her modem negotiates a 21-Kbps connection.

Polonius uses his trusty 14.4 modem to connect to Scandinavia Online (SOL), a commercial service. SOL routes his Web connection through a mire of mainframe computers that are already overtaxed by the many subscribers.



Shareware PICKS

Each time the next generation of the Macintosh Operating System (code-named Copland) slips further behind schedule, the Mac faithful get more restless.

So when *Macworld* gave users a sneak peek at the new interface for Copland ("The Mac's Jazzy New Face," July 1995) and provided a sampling of the icons online, the faithful rejoiced at this fanfare for the common Mac. After all, Windows got a face-lift, why not the Mac? Users cut and pasted icons to their hearts' content.

But that wasn't enough for Greg Landweber and Isys Development, who created **Aaron 1.1.3**, a $10 shareware extension that adds the look and feel of Copland's 3-D icons, menu bars, and dialog boxes to any 68020 or faster Mac running System 7. With Aaron you



get 3-D folder icons, new windows that include the WindowShade button for "rolling" a window up into its top window bar, and new Save and Copy dialog boxes. The package also includes a replacement display font (Espi Sans) that you select in the Views control panel to complete the Copland illusion.

You can find Aaron in the Macworld Online Software Library on America Online, as well as on our Web site in the Mentioned in Macworld section. Check it out.—M.H.

digital T1 line, with its 1544-Kbps potential, could receive a little over four of the 44K paintings in just a second. At $1000 or more per month, T1 service isn't cheap, but it is fast.

But even digital bandwidth is subject to delays. Every time you send data over the Net, the Internet protocol, TCP/IP, breaks it into small chunks, each of which may travel via a separate path. If too many individuals are accessing any given site along the way, you will notice a slowdown as the file waits for its tardy packets. And if you connect to a site that's connected to the Net by a 28.8-Kbps modem, even a T1 connection won't transfer data any faster than that modem can send it.

Tempus Fugit

"Let every man be master of his time," said Shakespeare's Macbeth. Someday, perhaps, but not in today's online world. Tiresome bandwidth bottlenecks will persist for some time, until the world's networks expand to meet ever-growing demand and fiber-optic lines reach into our homes. **m**

MATTHEW HAWN (**matthew@www.macworld.com**) is the production editor for Macworld Online. He believes that the most subversive thing you can do with information is give it away.

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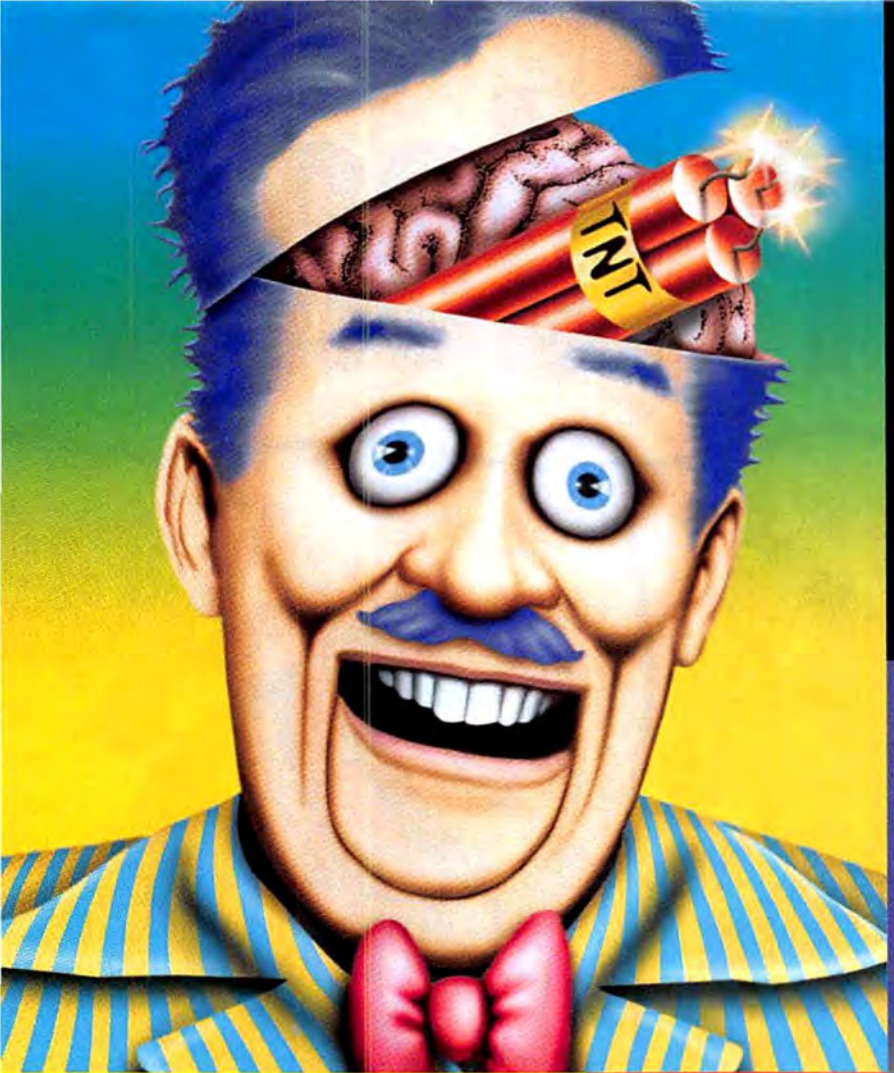
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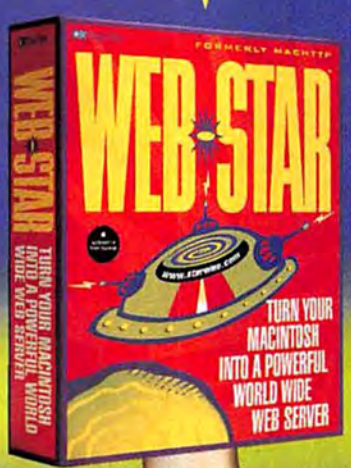
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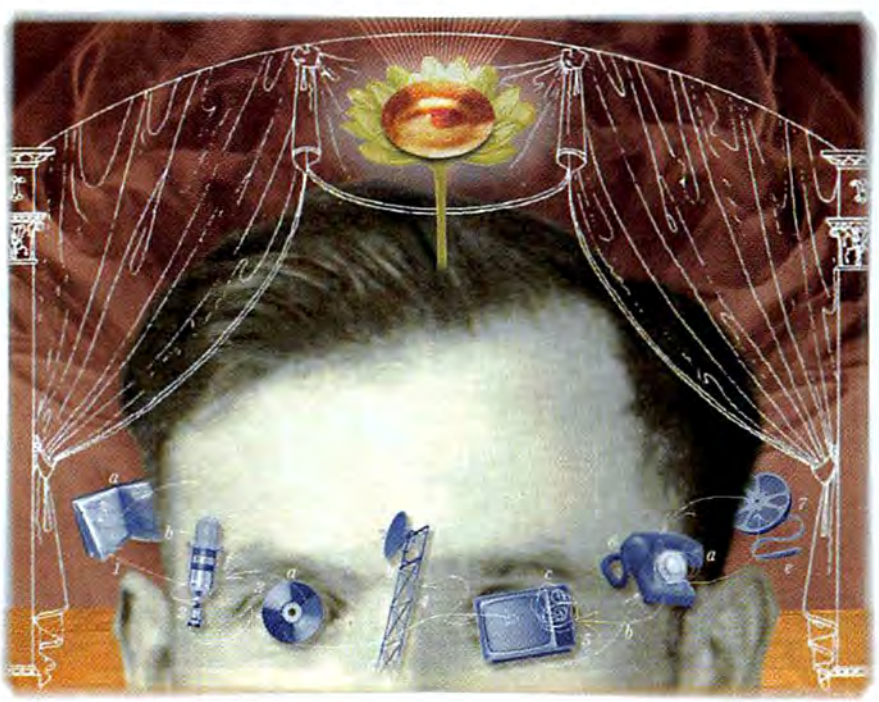
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Media

Gearing Up for Multimedia

ASSEMBLING A MEDIA-PRODUCTION STUDIO

by Jim Heid



Fact number one: Media—print publishing, electronic publishing, television, and the entertainment industry—are converging. As the borders blur, consumers read magazines on computer screens, listen to radio over the Internet, buy books and movies on CD-ROMs, and play audio CDs containing interactive liner notes. Graphic designers, publishers, filmmakers, record producers, and media moguls are diversifying into fields new to them—some to cash in, others to explore new outlets of creative expression.

Fact number two: The Mac has always been at the forefront of this convergence. While mulling over the Mac's role in media production, I rewound ten years to the February 1986 *Macworld* and found features foreshadowing where we are today: two on music and sound, one on designing your own fonts, and one on optical storage. The last predicted that optical disks would combine "video, audio, and data into a single, interactive supermedium."

With this column, I begin a new monthly assignment for *Macworld* focusing on video, audio, and interactive production. For me, it's a dream assignment that combines the vocations and avocations I've had over the years—graphics, publishing, audio, video, and programming. Many desktop media producers have similarly diverse backgrounds. Now we get to apply our interests in one place—at our Macs, coffee at hand, a wrist brace on each arm. Life is sweet.

The *Media* column is for anyone interested in the tools and production techniques behind digital video, audio, and multimedia projects such as CD-ROMs, kiosks, presentations, and World Wide Web sites. That's a broad scope and a broad audience, and my topics will vary accordingly. Sometimes I'll focus on a specific task: optimizing Macromedia Director's Lingo language, creating effects for QuickTime movies, or tweaking audio for CD-ROMs. Other columns will step back to provide the big picture: the process of producing a CD-ROM, techniques for outputting to videotape, hardware options for kiosks. Most columns will aim at professional, educational, and in-house corporate producers, but QuickTime tinkerers with AV Macs will also learn something. And even if your journey into multimedia ends with Myst, you may find it enlightening to learn what goes on behind the scenes.

STUART BRADFORD

The Multiple Steps of Multimedia

This illustration outlines the hardware, software, and typical processes behind various phases of media production. Future *Media* columns will examine the tools and steps behind each phase in detail.

Video

TYPICAL PROCESSES
Digitize, edit, apply special effects, compress

HARDWARE
- Macintosh system

For rough work only, AV Mac *OR*
For CD-ROM movies, Power Mac 8500 (with 2GB or larger hard drive) *OR*
For CD-ROM movies and low-budget, near-VHS-quality full-screen video, Quadra 840AV or Power Mac 7100AV or 8100AV with Radius SpigotPower AV card *OR*
For VHS quality to broadcast quality (depending on hardware), Power Mac (except 6100) equipped with high-end digitizing hardware

- Video source (camcorder, videocassette recorder)

SOFTWARE
- Digitizing and editing (Adobe Premiere, Avid VideoShop, or proprietary software that accompanies high-end digitizing hardware)
- Effects and processing (Adobe After Effects, Strata MediaPaint, Radius Cinepak Toolkit)
- Audio effects and processing software (see "Audio" section)

Audio

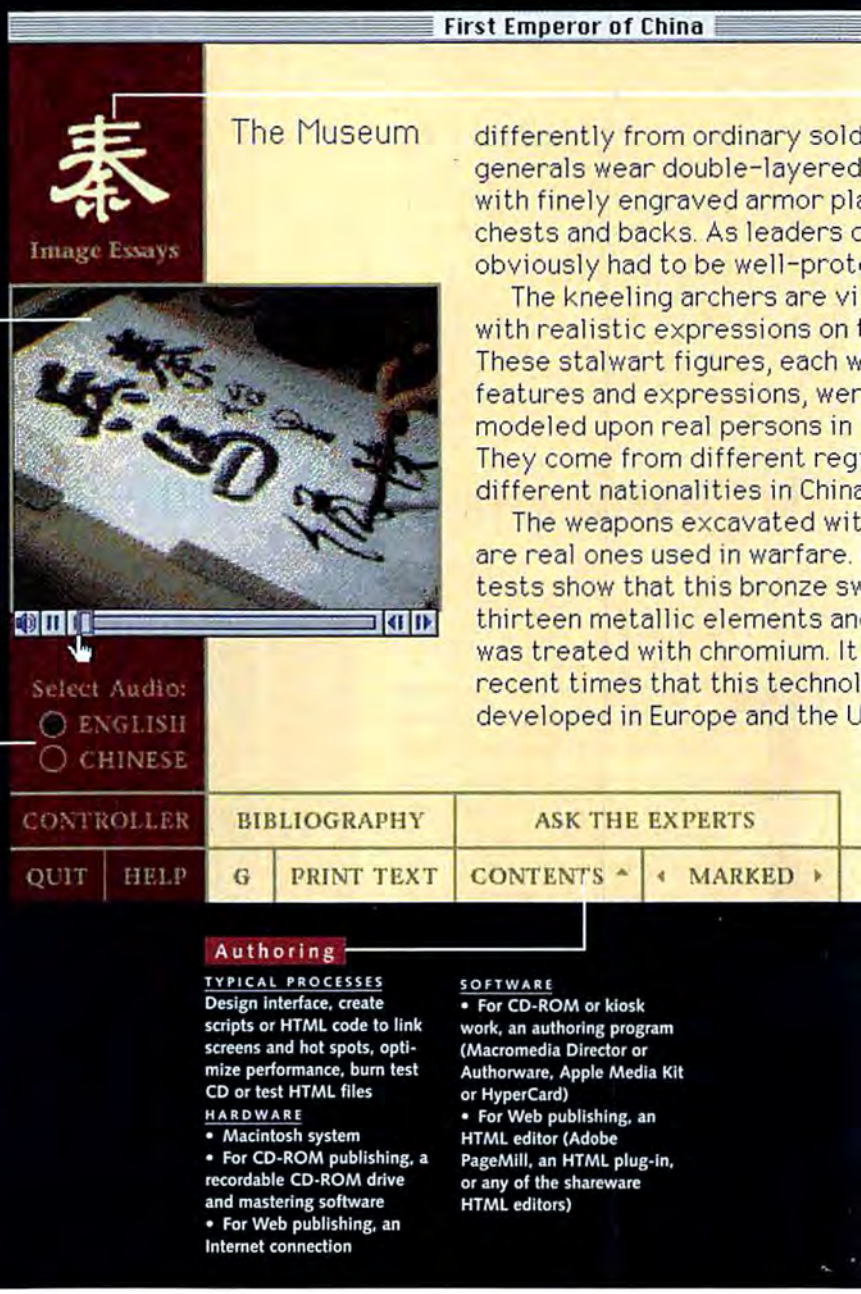
TYPICAL PROCESSES
Record, edit, optimize (equalization, downsampling, compression)

HARDWARE
- Macintosh system

For 16-bit, 44KHz sound at very near CD-quality (but not digital I/O), AV Mac or any Power Mac *OR*
For CD quality and digital I/O, NuBus-equipped Mac and third-party hardware such as Digidesign Audiomedia II

- Audio source (mixer, microphone, camcorder, or videocassette recorder)

SOFTWARE
- Recording and editing (Macromedia SoundEdit 16, OSC Deck II, Digidesign Sound Designer II, or Digidesign Session Software)
- Effects and processing (InVision Interactive's CyberSound FX); processing only (KS Waves L1 Ultramaximizer or C10 Compressor/Limiter)



Authoring

TYPICAL PROCESSES
Design interface, create scripts or HTML code to link screens and hot spots, optimize performance, burn test CD or test HTML files

HARDWARE
- Macintosh system
- For CD-ROM publishing, a recordable CD-ROM drive and mastering software
- For Web publishing, an Internet connection

SOFTWARE
- For CD-ROM or kiosk work, an authoring program (Macromedia Director or Authorware, Apple Media Kit or HyperCard)
- For Web publishing, an HTML editor (Adobe PageMill, an HTML plug-in, or any of the shareware HTML editors)

Outfitting for Multiple Media

For consumers, the best thing about interactive media is that it brings together text, graphics, animation, video, and sound, creating a whole that's greater than the sum of its parts. But this means the media producer is either wearing a lot of hats, assembling a team of specialists, or both. I'll devote the rest of this premiere column to an overview of the production process and its tools. Consider it a flyover of the topics future columns will explore in detail.

The journey to a full-blown interactive production has numerous stops along the way: audio production, video production, interface and screen design, and authoring. If you're producing a CD, kiosk, or Web site, you'll take the entire trip. But if you're a musician or sound engineer, you might go no further than recording and editing audio files. If you're producing a videotape, you'll need audio and video tools and expertise, but you won't have to contend with authoring or interface design.

Your projects will determine your hardware and software requirements. On one level, that's obvious: if you're producing audio programming, you don't need video equipment. But there's a subtle angle, too: your content's destination can also influence the amount of equipment you need for a given production. Older media-delivery vehicles require more sophisticated production equipment than newer ones. You need more gear for broadcast-quality video, for example, than you do to make QuickTime movies for a CD-ROM.

This is because new delivery vehicles such as CD-ROMs and the Web have rel-



atively slow data-transfer rates, or bandwidths. To create a movie that plays smoothly from a CD-ROM drive, or an audio clip that downloads quickly over a modem, you must process and compress video and audio in ways that reduce quality. (Balancing this quality-versus-bandwidth seesaw will be a common theme of future *Media* columns.) Older delivery vehicles such as radio, TV, videotape, and audio CDs don't have these constraints—they can deliver much better quality, and meeting their standards can mean costlier equipment.

How Low Can You Go?

So if you're producing a CD-ROM or audio for the Web, you might be able to get away with less-expensive equipment and shallower pockets. Maybe. Three factors still argue for using the best equipment your budget permits, even if your movies or audio clips will ultimately play on low-bandwidth systems.

• *Better gear yields better quality.* A professional camcorder and a high-end digitizing card give you better CD-ROM–based QuickTime movies than a Sony Handycam and an AV Mac. And Web-destined audio files sound better if you record them using professional-quality microphones and CD-quality standards. Low-end equipment generates more noise than high-end gear—noise that only becomes more apparent as the data is compressed and processed.

• *Bandwidths do broaden.* As new media-delivery vehicles mature, they'll support higher quality. Look at how CD-ROM video has evolved. In 1991, QuickTime movies measured 160 by 120 pixels and played at about 10 frames per second on single-speed CD-ROM drives. Today, CD-based movies commonly measure 320 by 240 pixels and play at speeds of up to 30 frames per second on 4× drives. Inexpensive MPEG cards enable a CD-ROM to deliver full-screen, full-motion video. And when cable and satellite delivery systems are available and ISDN connections are more commonplace, Internet radio will be capable of much higher quality. If you prepare your content at the highest quality from the outset, you'll be all set when wider bandwidths arrive.

• *Media can migrate.* Those movies you make for a CD-ROM might be perfect for a television program—but only if you produce them to broadcast-quality standards. Those RealAudio files on your Web site might make a great radio segment or CD—if you produce them at CD-quality standards.

On the other hand, if you're doing video for a low-budget CD-ROM or an in-house training videotape for distribution on VHS cassettes—and you don't plan to ever "repurpose" your media—you can get surprisingly good quality with low-end video gear (see "Multimedia Secrets," *Macworld*, August 1995). It all depends on your standards and budget—and on your ability to apply the little quality-enhancing tweaks I'll discuss in coming months.

So You Want to Be an Author

Producing an interactive piece—be it a CD-ROM, a kiosk, or a Web site—involves merging audio and video with text and still graphics to create a navigable entity. Here's where you don your interface designer's hat.

Part of this process involves designing and implementing a navigation scheme—the array of buttons and on-screen hot spots that let people navigate and view the media you worked so hard to create. This phase often begins on paper, with flowcharts and storyboards that form the blueprints for prototypes and the final product.

The next phase calls for a graphic designer skilled in the art of crafting layouts for on-screen viewing—downsampling a 300-dpi scan to the screen's 72-dpi resolution, for instance, or processing the image to look its best on computers that display only 256 colors. These steps occur for every one of the hundreds of screens that might make up a complete title.

Finally, the various pieces of media come together in an authoring program or HTML editor. In an authoring program, a programmer creates the scripts that activate on-screen buttons and hot spots, and display each screen's graphics. A good programmer also codes cleverly to control how elements load from a CD-ROM, for better performance. Web designers use a word processor or an HTML editor to create the HTML code that displays graphics and text, and links pages to each other (see "Build Your Own Home Page," *Macworld*, November 1995). And there's testing all along the way, looking for bugs and areas that might trip up new users.

The Road Ahead

Audio, video, interface design, graphics, programming—all these are topics this column will visit in the coming months. I invite you also to stop by my new site on the World Wide Web; you'll find some useful technical resources there, as well as links to media-oriented sites. Point your Web browser to **http://www.mcn.org/heidsite**. ■

Contributing editor JIM HEID's interactive CD-ROM accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995). He also produces audio segments for Radio Macworld (**http://www.macworld.com/tcccafe**).

Publishing Workshop

Finally, Some Resolution on Resolution

by David Blatner

Remember that *Star Trek* episode when Kirk plunges the androids into confusion by saying "Everything I say is a lie"? You can wreak equal havoc with desktop publishers: just ask, "What's resolution?"

Resolution isn't so difficult to understand. With a few concepts under your belt, you can master it. And you should: resolution is basic to all digital-publishing operations.

Device Resolution versus Image Resolution

The most basic problem is that the term *resolution* means two different things. *Device resolution* is used in the context of physical devices, such as scanners, monitors, and output devices (including machines that create halftones, such as laser printers and imagesetters, and machines that create continuous-tone output, such as film recorders and dye-sub printers). Device resolution tells you how small a dot a printer can produce, a monitor can display, or a scanner can "see."

The higher the resolution, the smaller the dot and the better-quality output you'll get—a 600-dpi printer is better than a 300-dpi one, but nowhere near as good as a 1270-dpi imagesetter.

Image resolution tells you how many pixels (the small squares that make up a bitmap) fit in an inch. While device resolution is always a fixed number, image resolution can be anything you want it to be; it all depends on how large the pixels are. You can size the pixels that compose an image up or down; the smaller they are, the more fit into an inch; the larger they are, the fewer fit.

A note about nomenclature: Many people mistakenly use the term *dots per inch* (dpi) when referring to any sort of resolution. I wish they would stop. *Dpi* should be used only to describe printer output, because printers literally place dots on paper or film. Bitmapped images are composed of pixels, and so should be defined in pixels per inch (ppi).

Image Size versus Pixel Density

Say you have an image that's 100 by 100 pixels. If you specify its resolution at 8 pixels per inch, each of those pixels will be ⅛-inch square, and your image will measure 12½ inches on a side. If, on the other hand, you specify that your image should be 4 inches square, you have effectively set its resolution at 25 ppi; for 100 pixels to fit on a 4-inch side, each each pixel must measure 1/25-inch.

Lpi versus Dpi

The expression *lines per inch* (lpi, also called screen frequency) sounds as if it has to do with image resolution, but it doesn't—not directly, anyway. Laser printers and imagesetters use halftone spots to simulate grays. Lpi defines how many rows of halftone spots make up a halftone screen—that is, how fine or coarse the screen is. Lpi does not apply to continuous-tone printers or line-art images because they do not use halftones.

LINE-ART RESOLUTION

When printing line art to an imagesetter, your line-art resolution should be at least 800 ppi. For finer work (where even tiny jaggies are a problem), you should try for 1200 ppi.



72 ppi 300 ppi



600 ppi 1000 ppi

Resolution and Halftones

What resolution an image requires depends on the image's level of detail and the lpi or screen frequency at which you're printing. Usually, a resolution of 1.4 or 1.5 times the lpi is sufficient, but an image with delicate detail (especially fine diagonal or curved lines, like boat rigging) may require a resolution of 1.75 or 2 times the lpi.

FINDING THE RIGHT RESOLUTION

SCREEN FREQUENCY	For normal detail		For fine detail	
	1.4X	1.5X	1.75X	2X
80 lpi	112 ppi	120 ppi	140 ppi	160 ppi
110 lpi	154 ppi	165 ppi	193 ppi	220 ppi
133 lpi	186 ppi	200 ppi	233 ppi	266 ppi
150 lpi	210 ppi	225 ppi	263 ppi	300 ppi
175 lpi	245 ppi	263 ppi	306 ppi	350 ppi

However, image resolution and screen frequency are related. When you're figuring out the resolution for a scan, keep in mind what lpi you'll use when printing the images. In general, your image resolution should be at least 1.4 times the number of lines per inch at which you're printing. For images with fine detail, image resolution should be higher—perhaps 1.7 or even 2 times the lpi.

A black-and-white line-art image doesn't depend on halftones, so lpi is also irrelevant in this case. The image resolution should be about 800 to 1000 ppi if you're printing on an imagesetter, 600 ppi if you're printing final art to a laser printer. If you're printing on uncoated stock or newsprint, you could probably get away with 600 or 700 ppi; you won't notice the difference after the ink bleeds into the paper.

Postscript on Pixels

Many graphics professionals don't bother to define resolution at all; they simply work with file size or number of pixels. They know that an 18MB color image has enough pixel data to fill a page with a high-quality image and that a 400-by-600-pixel image has only enough data for a good-quality 2-by-3-inch image. The more experienced you become with bitmapped images and resolution, the better you'll get at this sort of internal calculation. Then, when Captain Kirk starts popping questions, you'll be prepared for almost anything. **m**

DAVID BLATNER has coauthored several books, including *Real World Photoshop*, *The QuarkXPress Book*, *Real World Scanning and Halftones*, and *QuarkXPress Tips & Tricks* (all Peachpit Press). He presents at seminars and conferences around the country and in Japan. You can E-mail him at **david@moo.com**.

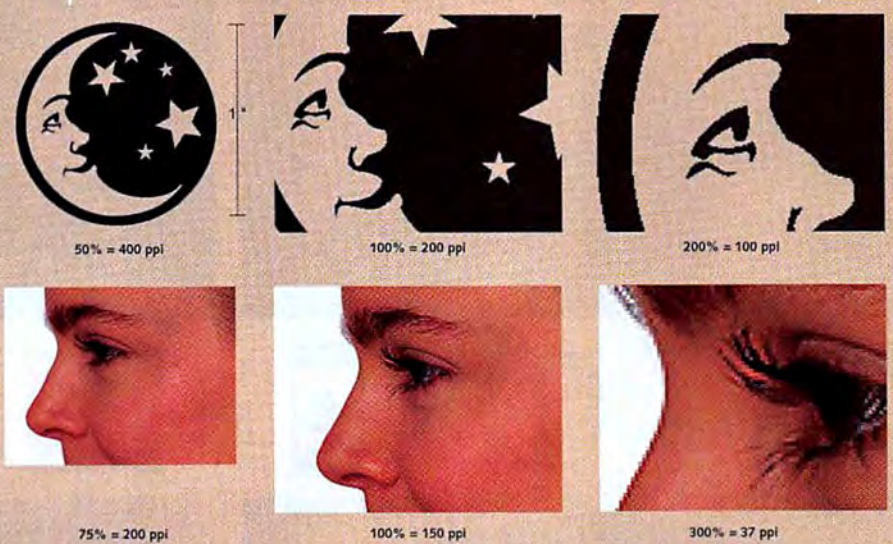
Scaling versus Resampling Images

As I noted earlier, when you scale a bitmapped image in a page-layout program, you don't change the number of pixels, so each pixel must get bigger or smaller. Image-editing programs like Photoshop, however, let you change the number of pixels, the resolution, or the size of an image independently. To do this, the program must *resample*, which entails throwing away or creating new pixels. For instance, if you halve the size of the image but leave the resolution the same, Photoshop *downsamples*—it throws away half the pixels. That means you lose image detail, though often it's detail you don't need.

If you double the resolution but leave the image size the same, the program has to *upsample*—it doubles the number of pixels, literally making them up. Some programs add information more intelligently than others (Photoshop's Bicubic interpolation is the best I've seen).

If you need to resize your images by more than 10 or 15 percent, it's usually better to resample them in Photoshop rather than just scale them in your layout program. You may get better quality, and you can sharpen them afterward (sharpening is almost always necessary).

SCALING BITMAPPED IMAGES

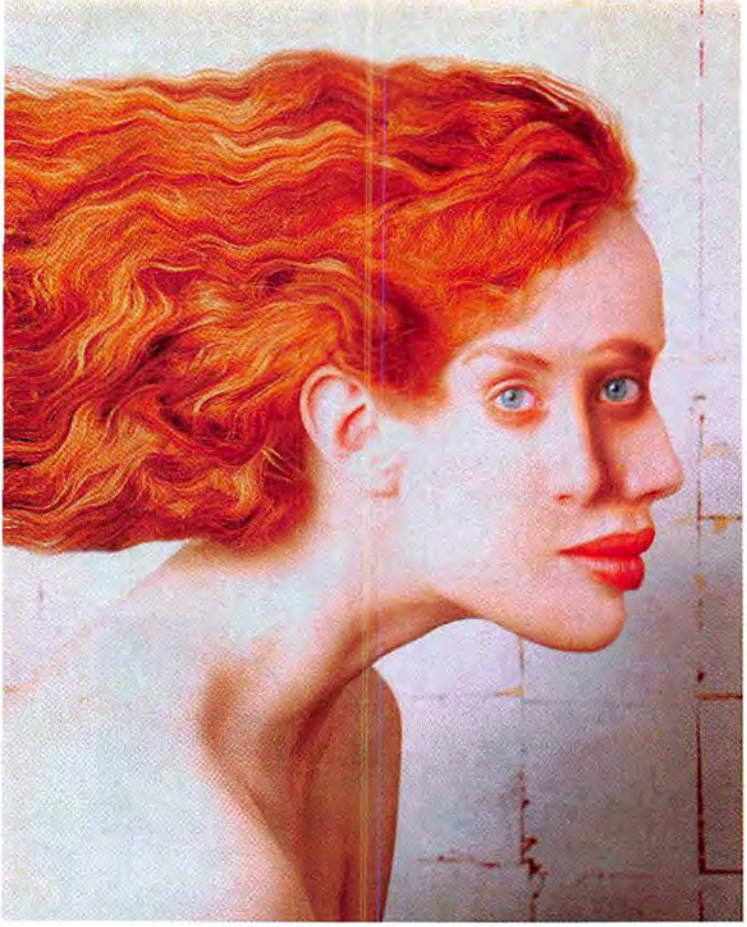


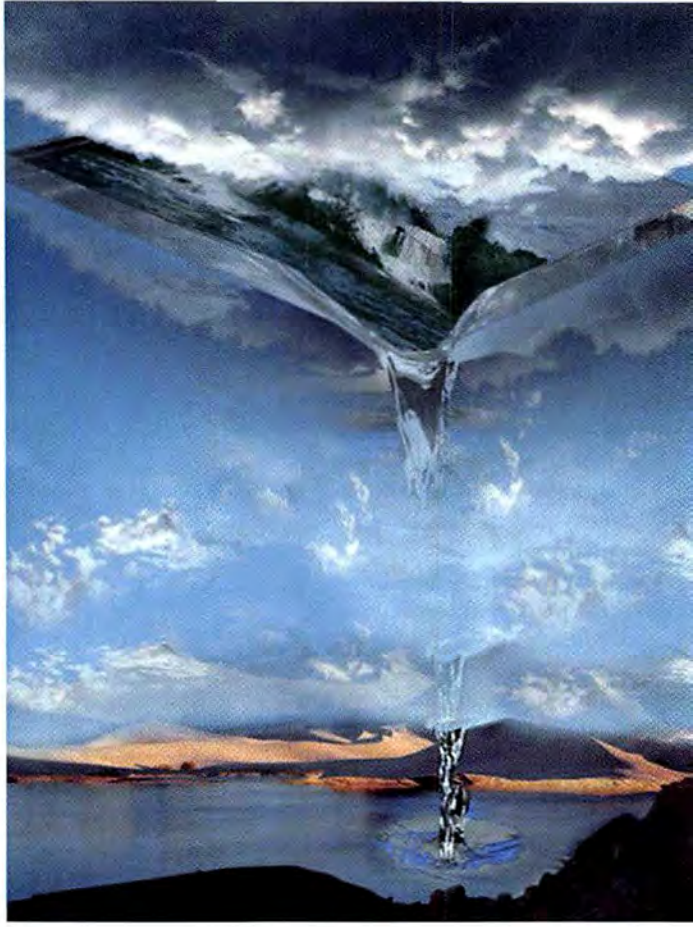
When you scale an image in a page-layout program, the number of pixels in the image doesn't change, so each pixel must get larger or smaller. If the pixels get too large, you get pixelization—the image looks jagged and spotty. When pixels are too small, you waste disk space, RAM, and print time, because you have more pixels than you really need. Past a certain point, the improvement is imperceptible.

RESAMPLING BITMAPPED IMAGES

If you resample an image in an image editor such as Photoshop, the program throws away or adds pixels. Downsampling is usually no problem, but remember that upsampling can't add details to an image—it just adds more pixels. Usually it makes the image look soft.







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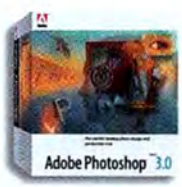




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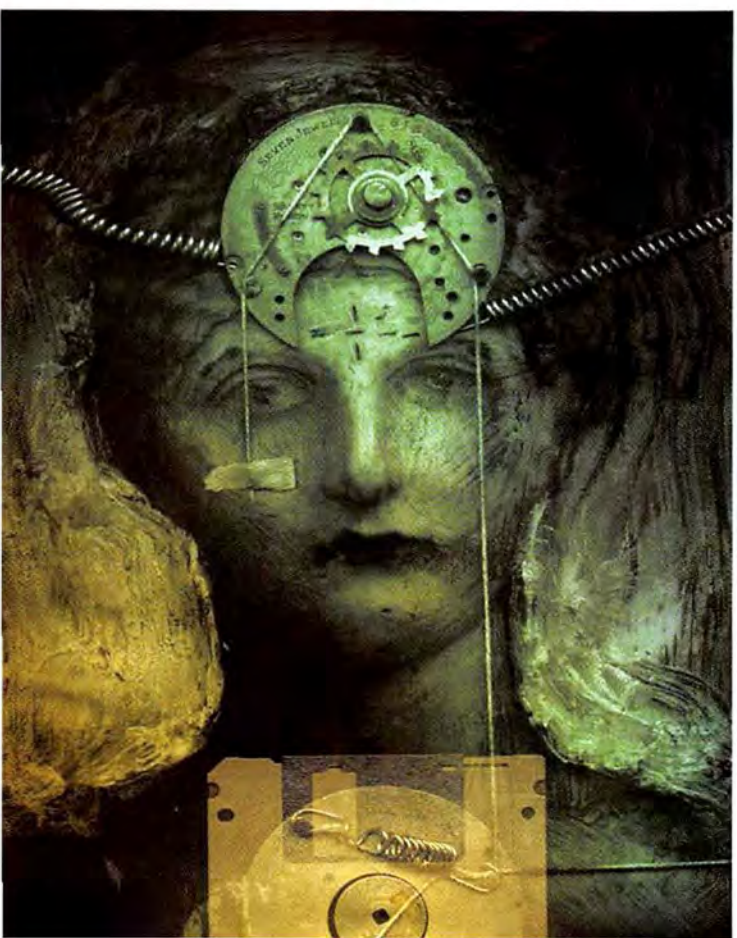


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Circle 250 on reader service card

MIKE SALISBURY

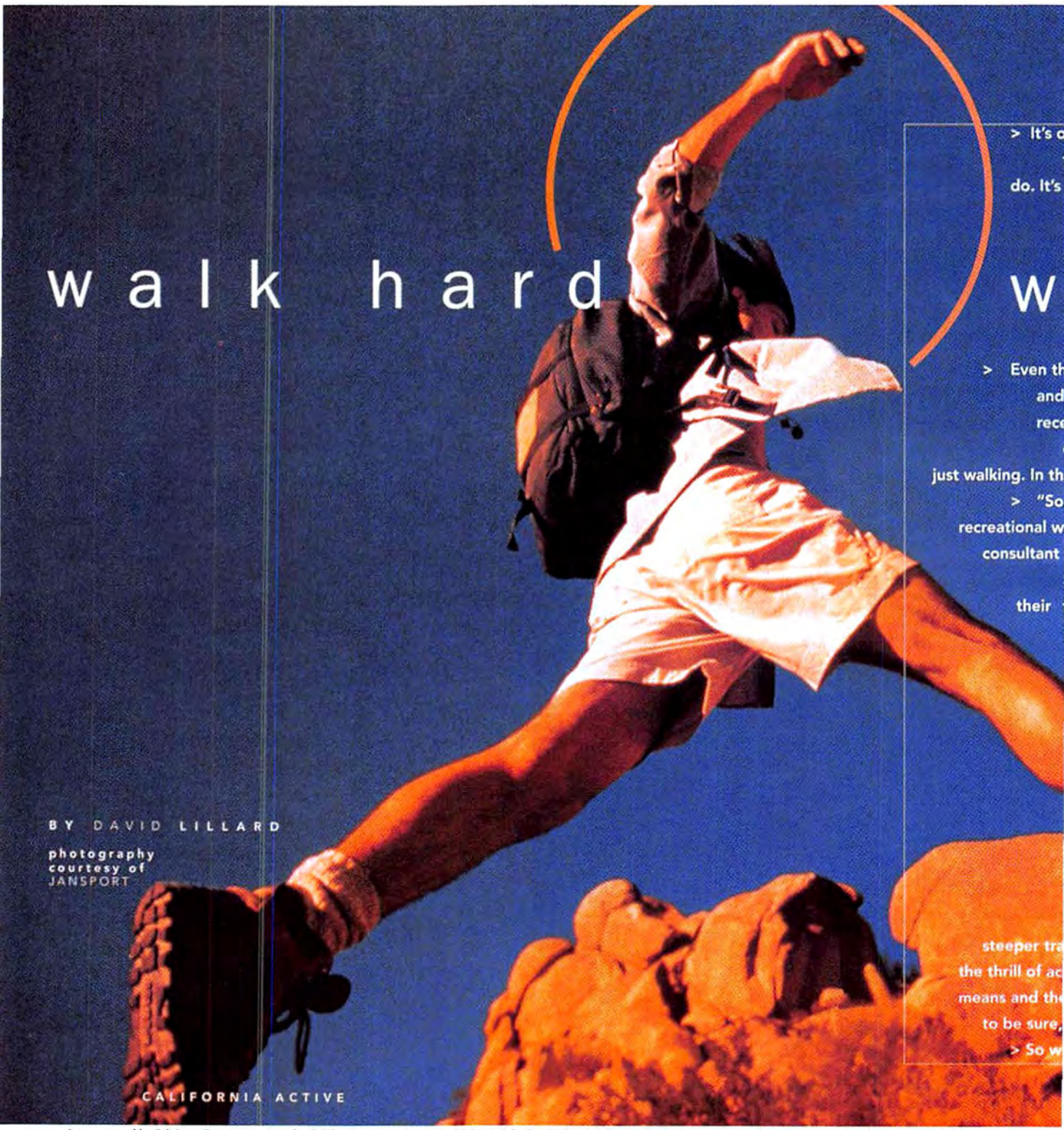
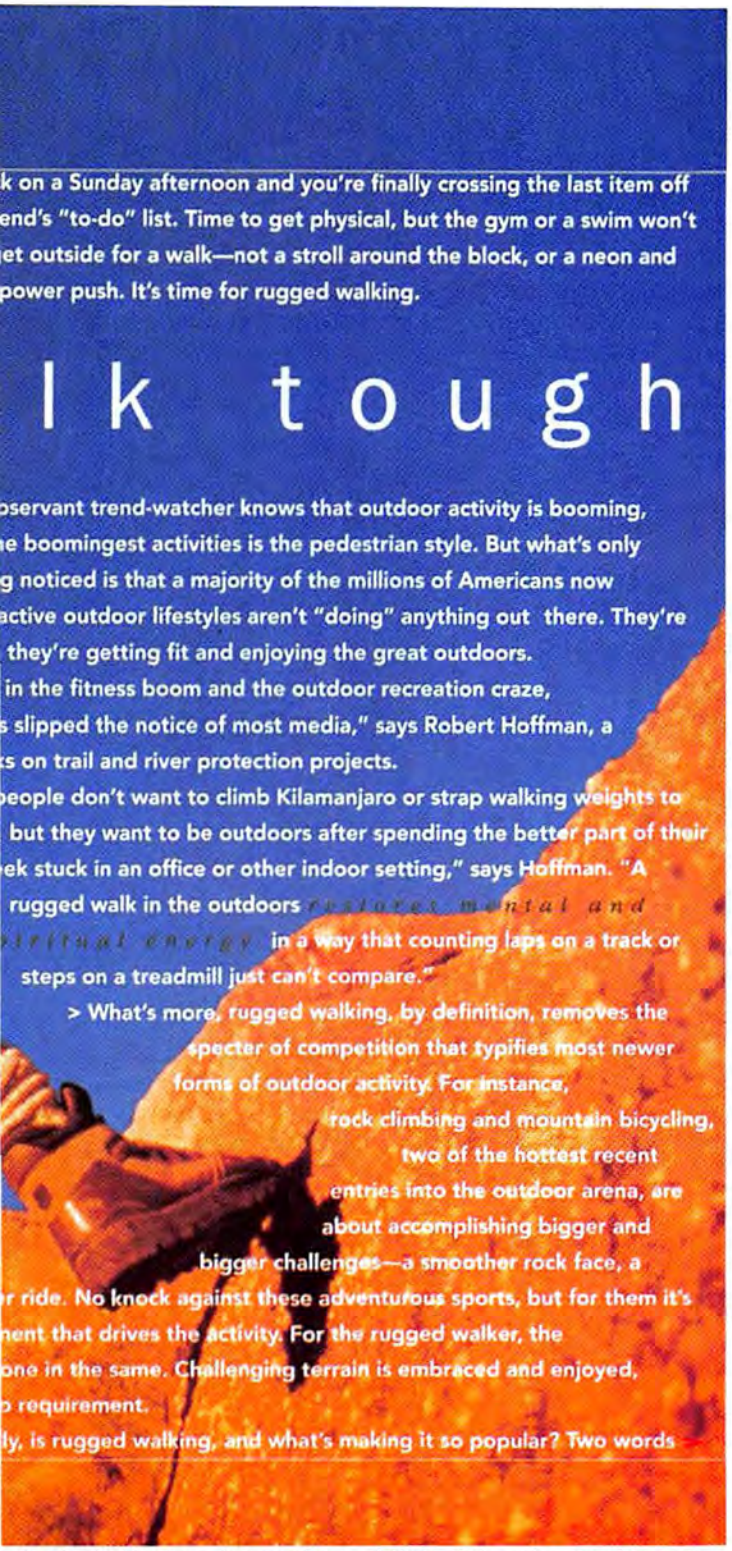


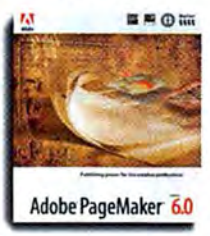
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on PageMaker 6.0.



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Mike Salisbury uses Adobe™ PageMaker™ to create designs so powerful they've become part of our collective consciousness. Layouts for Rolling Stone magazine, posters for Jurassic Park and Aliens, and Michael Jackson album covers bear his imprint. Now there's a radically new Adobe PageMaker 6.0 upgrade. "The interface is so natural, it never interferes with my ideas", says Salisbury, "and this new version is really over the top. I'm getting dead-on color from start to finish because it's locked into Kodak's Precision Color Management System." Hot new features include multiple master pages to streamline the creation of different page designs in a single publication; grouping and ungrouping to combine elements into a single movable, editable unit; integrated automatic trapping for color publications; and full compatibility with Adobe Acrobat™ and HTML so any document can be sent anywhere electronically. Adobe PageMaker 6.0 is here, so even if you're not creating professional design, this is the tool to give you professional looking results. Call 1-800-521-1976, Ext. K1272 for more information or visit our web site at http://www.adobe.com/.



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Wonder how we did it? Globe map ❶ is dragged from Adobe Photoshop and dropped into place. Adobe Gallery Effects™ is used for embossed look. Background pattern ❷ is created in Adobe Illustrator and rasterized in place. Glowing Edges filter ❸ is applied and masked into shape. Cone ❹ is created using Adobe Dimensions. The twirl ❺ effect comes from a Photoshop plug-in. DNA tail ❻ ending in the "o" for boy created with Path Patterns. "Ray" effect ❼ comes from Create Star filter. Chip's red cap ❽ cut using knife tool. And by the way, separations and printing were done directly from Adobe Illustrator 6.0.

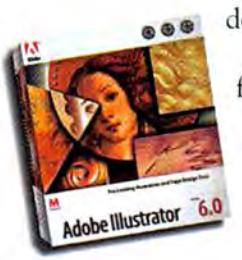
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Graphics Workshop

Creating Background Textures with KPT Bryce

by Cathy Abes

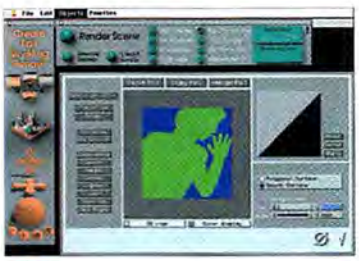
ARTIST: Don Arday is an associate professor of graphic communications at the University of Texas at Arlington. His illustrations have appeared in such publications as *Communication Arts*, *Step-by-Step Design Competition*, and *Print* magazine.

HOW IT WAS DONE: This image was done for a health-care magazine article about the lymphatic system. In keeping with the author's military metaphor for the body's infection-fighting system, Arday decided to simulate an aerial view of a battlefield, using a silhouetted human body as a landscape surrounded by water.

Intrigued by KPT Bryce's ability to transform imported PICT images into landscape elements, Arday decided to use it to generate the land and water. First he tried the method described in the Bryce manual to create a landscape from the body silhouette. But parts of the contour eroded, and the resulting terrain resembled a decomposing body—not a good effect to convey winning a battle against infection. Arday also discovered that the Terrain Editor's square window distorted the figure's horizontal proportion.

So he tried something different. Choosing one of Bryce's many preset terrains, he mapped a 3-D solid texture onto it, adjusting the various settings, including color, illumination, and bump gain. This resulted in a much subtler landscape texture than he'd originally created.

Arday used essentially the same technique for the ocean but wasn't satisfied with the initial result: the ocean looked too still and too close to the viewer. But a few minor adjustments yielded a surprisingly realistic water texture. **m**



1 After creating a body silhouette in FreeHand from a scanned pencil sketch, Arday exported the image to Bryce. In Bryce's Terrain Editor (Objects menu), he used the Paste PICT option to paste the image in.



2 Arday applied the Add Noise and the Add Erosion options—each one twice, to create a realistic terrain texture. These changes barely affected the terrain, but they drastically eroded the body's contours, especially in complex areas, like the fingers.



3 After setting the atmospheric controls (illumination, textures, mapping, and so forth) in the Materials Editor and rendering the terrain, Arday found that the distorted contour and eroded landscape made the human form appear decayed—not at all the look he wanted.

THE TOOLS

Hardware: Power Mac 8100/80AV with 56MB of RAM and 2MB of VRAM; 500MB internal hard drive; 740MB external hard drive; 100MB external hard drive; Sony MultiScan MG 17-inch color monitor; 44MB SyQuest removable-cartridge drive; Microtek II GS 24-bit color scanner.

Software: Adobe Photoshop 3.01; Macromedia FreeHand 4.0; KPT Bryce 1.0.





4 Back at square one, Arday chose a mountainous terrain from the library. After adjusting the terrain's angle and altitude in the Terrain Editor for an aerial view, he used the Add Erosion option. He chose a 3-D solid texture called Atlas to map onto the terrain.



5 After adjusting the Frequency, Alpha, Color, Bump Gain, and Effects settings, Arday used the Diffuse and Specular options to select colors. Next he set Illumination by adjusting Softness, Optics, and Highlights. Finally, he clicked on the Mapping button and set the texture-mapping option to World Space.



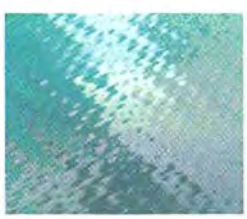
6 For the ocean, Arday clicked on the Ground icon (Master Palette) and selected Water, adjusting the perspective to conform to an aerial view. Choosing a 3-D solid texture, Waves, he adjusted all the sliders until he got the effect he wanted.



7 Just as he had with the landscape, Arday adjusted the Illumination values for the water, giving it these numerical settings: Ambient (4), Diffuse (30), Specular (142), Reflectivity (160), Transmitivity (0), and Refract Index (133).



8 Arday felt the water looked too still, so he added Bump Gain to simulate the turbulence likely to result from wind and helicopters hovering just above the surface.



9 Adding Bump Gain produced the desired waves, but the ocean looked too close for an aerial view, so Arday increased the Frequency setting until he had the right effect.

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Buyers' Tools

Full-Size Color Displays

MACWORLD LAB PICKS THE BEST TWO-PAGE MONITORS

by Peter M Stoller

For today's fast-paced world of high-end graphics, desktop publishing, multimedia production, science and engineering, there's no such thing as a screen that's too large. Virtual desktop space rates a higher priority than real desktop space, because time spent scrolling is time wasted . . . and time, after all, is money.

For an average of two to three times the price of a 17-inch monitor, a two-page monitor nets you nearly twice as many pixels (given standard Macintosh display resolutions), widening the pan-and-scan bottleneck considerably. If you're buying or upgrading a graphics-oriented Mac workstation, a two-page monitor should be on your shopping list.

To help you shop, *Macworld* rounded up 13 two-page monitors. Macworld Lab ran a series of tests to measure three of the most critical display-quality factors: brightness, contrast, and distortion. All the monitors passed these tests (see "Two-Page Monitors: Subjective Tests Are Critical").

That, however, doesn't tell you how they really look. So we had our expert panel of *Macworld* editors and designers judge every monitor subjectively for focus, brightness, contrast, color, glare, distortion, and controls. These were the most revealing tests; while our judges found no bargains or significant bonuses at the extremes of the price range, they plucked a few superior performers from the pack, at around $2000. Using similar procedures as you shop, you too can pick a winner.



KEVIN CANDLAND

Image Is Everything

Simply put, you want to buy the monitor with the best-looking picture. If it does not display a clear, bright, vibrant image, it isn't doing its job, and that makes it harder for you to do yours. Before choosing, though, you need to know what you're looking for and how to look for it.

If the monitor isn't bright, you'll strain to see the image. Brighter is better, to counter brightly lit working environments and dimming of the monitor with age. Contrast, the ratio of white luminance to black, goes hand in hand with brightness. The higher the contrast ratio, the better the resolution of details.

A dim monitor or one with poor contrast will appear washed-out. You can test this as we did. On the monitor, pull up a gray-scale photo containing highlights and shadows. Check carefully for range and detail, and adjust both brightness and contrast controls for the best image. Details in light and dark areas should be clearly visible.

Even the brightest monitor is worthless if it isn't sharp and clear. Try our acid test: a full-screen spreadsheet. Check for clear, readable characters and sharp grid lines across the entire display area.

To test color, use a photo with rich primary colors, assorted secondary shades, and flesh tones. Look for vibrant and realistic colors across the spectrum, with no overbearing tint.

Getting the most out of a monitor

can take some tweaking, so give the controls a workout before you buy. How easy are they to understand and use? Do they do everything you need? Are the controls you use the most, easily accessible?

Shopping Smart

Here are a few more tips to make monitor shopping easier and more efficient.

Image quality is variable and subjective, so examine your options in person before you buy, if possible. If you must shop by mail, make sure the dealer has at least a 30-day, money-back guarantee (and find out about any restocking fee charged for returned goods).

Call ahead to make sure the store has what you want to see in stock, on display, and attached to a Mac. Ask the dealer if you can test the monitors, and if so, bring applications with prepared documents (such as those described above) for your tests. Bringing your own external hard drive would be ideal, as stores have limited software on—and restricted access to—their hard drives.

Believe your eyes, not your dealer's. Salespeople can be helpful, but they're also working on the basis of margins and commissions. Pay attention to lighting, too; even the best monitor looks wan with direct sunlight on the screen.

Don't get "featuritis"; more features do not add up to a better monitor. Buy what you need, not what looks cool. Also, don't get confused by marketing. Two-page monitors are advertised variously as 19 inch, 20 inch, or 21 inch, but the display areas are roughly the same for the top performing models, and display resolutions are identical with the Mac's internal video, 1152 by 870. (Some monitors

Big Screen Up Close

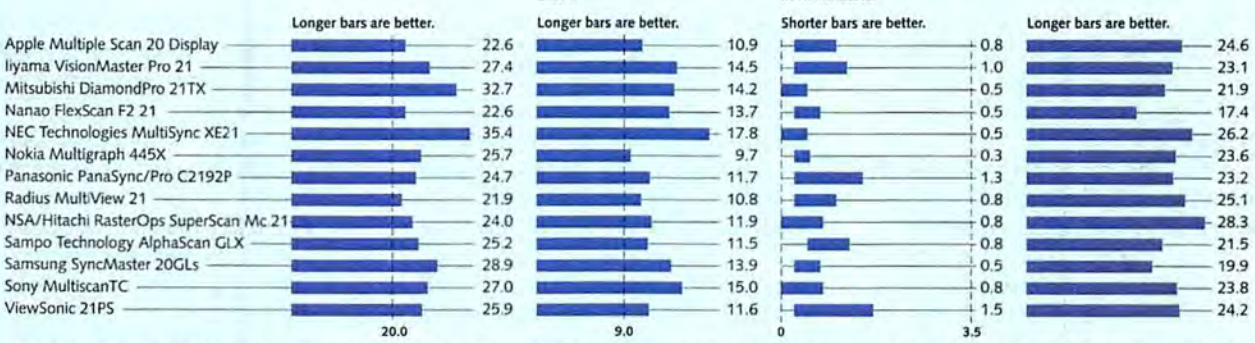
Company	Monitor	Star Rating [A]	List Price
Apple Computer	Multiple Scan 20 Display	★★★/6.2	$2149
Iiyama North America	VisionMaster Pro 21	★★★/5.3	$1995
Mitsubishi Electronics America	Diamond Pro 21TX	★★★/5.8	$2199
Nanao	FlexScan F2 21	★★/4.4	$2299
NEC Technologies	MultiSync XE21	★★★★/7.3	NP
Nokia Display Products	Multigraph 445X	★★/4.8	$2775
Panasonic Communications & Systems	PanaSync/Pro C2192P	★★★/5.0	$1999
Radius	MultiView 21	★★★/5.8	$2149
	Editors' Choice		
NSA/Hitachi	RasterOps SuperScan Mc 21	★★★★/7.3	$2299
Sampo Technology	AlphaScan GLX	★★/4.2	$1495
Samsung Electronics America	SyncMaster 20GLs	★★/4.1	$1599
Sony	MultiscanTC	★★★/5.9	$3950
ViewSonic	ViewSonic 21PS	★★★/5.8	$2095

NP = Not provided by company. [A] Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star

[I] Mac adapter $25 to $30 extra for Iiyama and Sampo; Mac dealers include adapter with Samsung unit at no extra cost. [D] 30-day dead-

Two-Page Monitors: Subjective Tests Are Critical

All monitors performed within acceptable limits on our objective tests for brightness (at least 20 footlamberts), contrast (at least a 1-to-9 ratio), and distortion. Because overall visual quality depends on the interplay between these factors as well as external lighting conditions and each individual's personal taste, higher or lower scores within acceptable limits do not in themselves clearly indicate superior or inferior quality. Therefore, the subjective rating is the best indication of relative performance.



BEHIND OUR TESTS

Macworld Lab tested three key aspects of visual quality—brightness, contrast, and distortion. To measure maximum brightness at the center of the screen, as well as contrast (the level of detail in both light and dark areas of an image), we used a Minolta luminance meter on a standard black-and-white target screen. We measured distortion, how accurately shapes are displayed, with a black-and-white target that places 1-inch squares in the corners, along the edges, and in the center of the display. Using an antiparallax ruler, we compared the size of the outer squares with the size of the center square. A panel of *Macworld* editors and designers also gave each product a subjective score in the following critical areas: color, contrast, brightness, distortion, focus, glare, and controls, on a scale of 1 to 5 for each factor. Therefore, 35 would represent a perfect score.—**Macworld Lab testing supervised by Matt Clark and Tim Warner**

Company's Estimated Street Price [B]	Phone	Maximum Viewable Area (in inches)	Dot/Stripe Pitch (in mm)	Warranty (in years) on Parts/CRT/Labor
NP	408/996-1010	11.5 x 15.3	.31	1/1/1
$1895 [C]	215/957-6543	11.7 x 15.6	.30	3/3/3 [D]
NP	714/220-2500	12.0 x 16.1	.30	3/3/3
$2081	310/325-5202	11.9 x 16.0	.28	3/3/3
$1899	508/264-8000	11.9 x 15.8	.28	3/3/3
$2199	415/943-4071	12.0 x 16.0	.26	3/2/3
NP	201/348-7000	11.8 x 15.7	.25	3/3/3 [E]
$1850	408/541-5700	11.7 x 15.7	.25	1/1/1
$2200	617/461-8300	11.8 x 15.8	.28	3/3/3
$1200 [C]	770/449-6220	11.4 x 15.2	.28	2/2/1
$1325 [C]	201/691-6200	11.2 x 15.1	.28	3/3/3
NP	408/432-0190	11.5 x 15.3	.30	3/2/3
$1895	909/869-7976	11.9 x 15.8	.25	3/3/3

Ratings section for full explanation.) [B] *Actual prices could be higher or lower than the estimated street price provided by the company.* *on-arrival replacement; $99 48-hour swap program.* [E] *One year on-site service.*

will sync to higher resolutions with a third-party video card.)

Make sure the monitor comes with a Mac multisynchronous adapter. If it doesn't, you can get a third-party adapter for $25 to $30. Nearly all the companies in our survey include a Mac adapter or will send one free on request. Only Iiyama and Sampo charge extra.

If available desk space is tight, measure it, then check contenders' footprints. Iiyama's VisionMaster Pro 21, for example, is particularly compact.

Use a credit card; if the store won't accept one, shop elsewhere. Also, make sure the store has a good return policy; just because the display unit looks great in the store doesn't guarantee that the one in the box will look good in your working environment.

Warranty and Support

A great-looking monitor is still an iffy investment if the manufacturer doesn't stand behind it. Most of these companies offer three-year, all-inclusive warranties. Apple and Radius have the shortest warranty, at just a year. While monitors aren't prone to failure, you'll sleep easier with a longer warranty.

How do these companies stand behind you? To grade technical support, we called each company three times with problems ranging from the trivial to those requiring factory service. We judged each tech-support department for accuracy, accessibility, and attitude. Most companies rated as acceptable or better in our test; NEC, Nokia, and Radius all rated as excellent. Samsung and ViewSonic, however, earned a poor rating, while Nanao, Panasonic, and Sampo were rated as unacceptable. We'd think twice before purchasing a monitor from one of the latter three companies.

Price Performance

What price performance? Sampo and Samsung offer low prices, but their monitors are no bargains. They use older, cheaper CRTs with excessive vertical curvature, creating a distracting (glare-catching) fishbowl effect. With their otherwise unexceptional performance and lackluster tech support, we suggest you give them a miss. You'll also want to pass on Nanao's FlexScan F2 21, which fell at the low end in performance without the low-end price.

The high-end Sony MultiscanTC includes a special base, has a probe for adjusting color uniformity, and uses what Sony calls Beam Current Feedback to keep the white balance stable. It works, but at nearly twice the price of the other monitors, the MultiscanTC should perform exceptionally rather than just acceptably in all areas, and we'd expect much better than Sony's hard-to-use, and harder-to-read, on-screen controls.

Actually, what we'd really like for that price is the Radius PressView 21 SR (not evaluated for this article; see *Reviews*, elsewhere in this issue). For a list price of $3999 ($3100 on the street), you get one serious color prepress display and proofing tool. You can match display colors to color models in the PressView's database, or use the included colorimeter to calibrate the monitor to output from any device. Radius's new custom CMYK-to-RGB tables for Adobe Photoshop allow consistent on-screen proofing of film. You even get a ColorShield hood to prevent color tinting from overhead lighting. If you need the ultimate in color precision, check out the PressView.

The Last Word

In the end, the Editors' Choice was as clear as its crisp display: NSA/Hitachi's RasterOps SuperScan Mc 21 was our runaway favorite for focus, brightness, contrast, and color. Its controls coordinate easy-to-use, dedicated hardware buttons with a clear on-screen display of control values. It's slightly more expensive than most of the other monitors, but superior performance makes it a best buy.

Honorable mentions go to the NEC MultiSync XE21, with its excellent on-screen controls and bright, richly colored display (though it was not as sharp as we'd have liked) and the Apple Multiple Scan 20 Display, which lacked some sparkle but rivaled the RasterOps Mc 21 for sharpness. Any of these monitors would make a worthy addition to your desktop. Now all you have to do is clear enough space to put one there. **m**

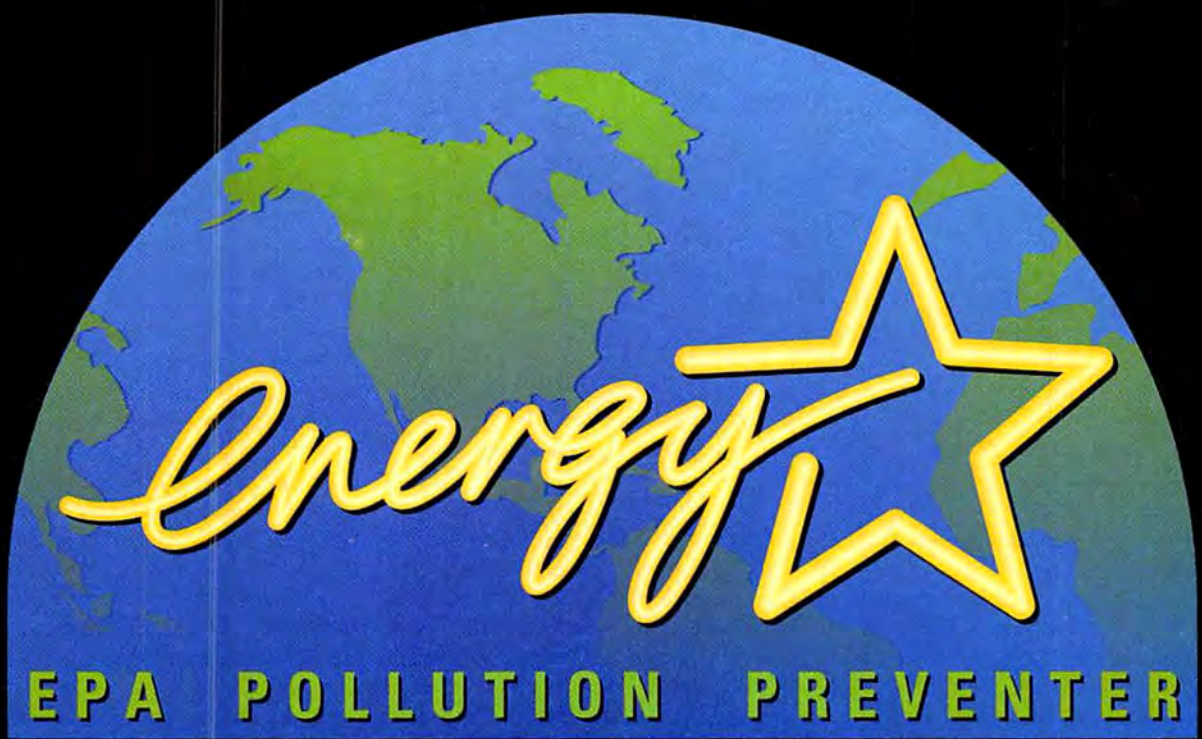
PETER M STOLLER is a Los Angeles–based Macintosh consultant who delights in solving arcane Mac problems in America Online's Macintosh Operating Systems forum (**AFCpeters@aol.com**).

TWO-PAGE MONITORS

MW EDITORS' CHOICE *Macworld* used lab instruments and trained eyes to determine the best image quality; we also examined the controls, interface, features, price, and support to find the best value.

★★★★/7.3 **RasterOps SuperScan Mc 21** The SuperScan took top honors in every important performance category and won kudos for its sensible, intuitive controls. All this, and at a reasonable price. **Company:** NSA/Hitachi. **List price:** $2299.

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Consumer Advocate

by Tom Negrino

How to Spend a Little, Get a Lot—with User Groups

USER GROUPS PROVIDE A WEALTH OF LOW-COST SERVICES

LAST MONTH I TALKED about how to find and join a Macintosh user group (MUG). This month I take a closer look at the many services offered by user groups—services that can save you a bundle.

Most people join user groups to get help with their computers and software. MUGs address this need via help lines, newsletters, and training classes.

Many MUGs maintain a list of volunteers who offer free telephone assistance to group members on particular programs or for specific needs. For example, my group's newsletter lists 11 people willing to help beginners and 5 experts ready to field questions about QuarkXPress. Their help should be used when you're stuck with a problem in a program, not for plain old training. You'll probably be able to get detailed instructions in your MUG's training classes, and at a reasonable cost (generally under $30 for a two- or three-hour class; hands-on classes can be more expensive). The instructors are often other MUG members, many of whom professionally use the programs they are teaching.

Almost all MUGs put out a newsletter, generally monthly, packed with useful information. The newsletters include product reviews, feature articles, and opinion columns, as well as listings of the MUG's meetings and events. One caveat, however: product reviews that appear in user-group newsletters don't go through the kind of rigorous editing process that, say, *Macworld* reviews do. While many of a newsletter's reviews can be fair and accurate, I've seen some written by people who obviously had personal grudges against the product or the company that made it. Apply grains of salt as needed. In some newsletters, you'll also find ads from local businesses offering hardware deals, service bureaus offering imagesetting services, and consultants ready to build a database or give one-on-one training.

The recommendations of MUG members regarding local computer dealers are a valuable resource. This word-of-mouth information can steer you toward dealers who treat their customers well, or away from those who don't. Members' recommendations are especially welcome when you need a service department. Incidentally, MUG members tend to be an opinionated lot; by asking around at meetings or on the group's BBS (bulletin board system), you're likely to get the real skinny on almost any Mac product from people who actually use it, and who can detail both its strengths and its weaknesses.



Road Shows

The main event at most user groups is the monthly meeting where vendors demonstrate their products and industry speakers hold forth on a variety of topics. These meetings can range in size from a couple dozen members to more than a thousand people, depending on the size of the user group. The group usually invites one or two companies to give demonstrations that last about an hour each, followed by a question-and-answer session. The unique quality of user-group shows is that they are long on information and short on marketing hype. Most companies know from experience that MUG members are highly skilled computer users, with little tolerance for a demonstration high in fluff and low in content. I've seen unprepared presenters raked over the coals by an annoyed audience, and it wasn't a pretty sight.

As I mentioned last month, software vendors usually provide a few copies of their product for the group to raffle off, with the proceeds benefiting the group. Finally, the companies almost always offer a special, better-than-anywhere-else limited-time offer on their product for the meeting's attendees.

Getting It Cheap

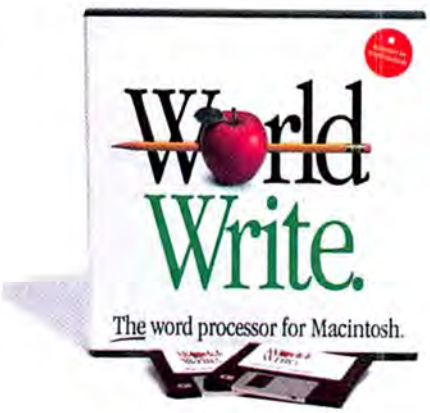
MUGs offer lots of ways to stretch your computer dollars. The User Group Connection, an independent spinoff from Apple that promotes user groups, operates the User Group Store, which sells surplus and Apple-refurbished Macs and peripherals to MUG members for low prices. It also sells software and accessories, often below mail-order prices. This program works on a point system, so that when you buy a computer, your user group earns points that it can redeem for hardware. My local group obtained two Power Macintoshes through the Store, which we used to stock our classroom for a hands-on training program. The User Group Store (800/350-4842) sells only to U.S. user-group members.

Most MUGs host swap meets during the year, where members can sell their old hardware and software. It's a way to clear

continues

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Bugs and Turkeys

If you are forced to work with the Windows world, watch out for Astound 2.0. The latest version shipped without the Mac-to-Windows converter, so you can forget about running your presentations on a PC—at least until the company gets around to shipping the Windows player sometime after the beginning of the year. Gold Disk, 408/892-0200.

StrataStudio Pro 1.75 cannot reliably open and render 3-D models on Mac computers, even if the Mac has 64MB of RAM. Strata says QuickDraw 3D has "some very serious memory limitations with larger models." Apple says QuickDraw 3D 1.0.3 addresses many of these concerns. Strata (801/628-5218, **info @strata3d.com**) released 1.75+, a free upgrade with improved memory control. Both upgrades can be found at **http://www.strata3d.com**. QuickDraw 3D 1.0.3 is also available at **http://www.info.apple.com/qd3d**.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

your closets of too-small hard drives and last year's modems, not to mention those adventure games you finished long ago. In order to comply with software manufacturers' licenses, many groups require that you sign an ownership-transfer statement.

Welcome to Cyberspace

The majority of MUGs run SoftArc's easy-to-use FirstClass BBS software, which has a Mac-like graphical interface. When you log on to a FirstClass BBS, you see a group of folders offering conference and file areas. Conferences, which are arranged by topic, are a good place to post questions and opinions. And the BBS's file areas offer several hundred megabytes of freeware and shareware. However, an increasing number of user groups are launching sites on the World Wide Web.

Joining your local user group can save you not only money but an even more precious commodity—your time. Every month you'll get information that will help you use your Mac more productively and enjoyably. For typically less than $50 annual dues, a user-group membership is an investment that's hard to beat.
—TOM NEGRINO

Letters

Unrealistic Expectations I am writing this in order to find some support, suggestions, or advice on what to do about my nightmarish experience with Apple Computer.

My new Power Mac 7100/66, after three months' use, began crashing and hanging even when left idle. I called Apple tech support; after four calls' worth of advice, a service representative replaced my hard drive, motherboard, and SCSI cable. Two weeks later the technician came back and reseated the memory and replaced the video card, power supply, and replacement motherboard.
continues

Streetwise Shopper

Adobe Illustrator 6.0 Update of $595 draw program (Sep 94 ★★★★ version 5.5) available to competitive product owners for $149. Call Adobe, 415/961-4400.

DOS Mounter 95 $99.95 cross-platform file-transfer utility (Apr 94 ★★★★ DOS Mounter Plus 4.0) available for $49.95 to competitive product users. Call Software Architects, 800/404-0002.

PageMill $199 Web authoring tool available for $99. Call Adobe, 415/961-4400. *Offer expires 1/15/96.*

Secure WebServer Security Watch Service enables users to test their own browsers for reported security problems. Also offers licensed users of problem Web servers Secure WebServer as free trade-in. Call Open Market, 617/621-9500.

Sony 3½-inch HD Diskettes $30 mail-in rebate on 100-pack. From MacWarehouse (908/367-0440) for $64.99 (ME 6469). *Offer expires 3/31/96.*

SummaJet 2 Ink-Jet Plotters Monochrome discounts: $200 (D-size), $400 (E-size). Color discounts: $300 (D-size), $600 (E-size). $395 plotter stand free to customers purchasing plotter between 9/1/95 and 12/31/95. Call Summagraphics, 512/835-0900. *Offer expires 2/28/96.*

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If you're interested in the digital arts or helping children, we've got an event you'll want to attend. Announcing NEC Technologies' 3rd annual MACWORLD Expo charity event, "A CELEBRATION OF DIGITAL ART." Shriners Hospitals for Crippled Children will benefit from this charity event, being held during the second evening of MACWORLD Expo Wednesday, January 10th, 1996 from 8pm. to midnight at the GiftCenter Pavilion (888 Brannan Street, corner of Brannan and 8th.) Samples of outstanding digital art created by Graphic Design Professionals as well as Shriners children will be on exhibit, and there'll be a performance by D'Cuckoo, a local cybertribal world funkband. You can't find a better reason to attend than contributing to the rehabilitation of these children.

Tickets: $7.50 at NEC's MACWORLD Expo Booth (#1017), $10.00 at the door.
Admission includes complimentary food and refreshments.
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THE MACINTOSH® AUTHORITY

Two weeks after that it was dead again. This time I took it to an Apple-authorized service center, where it now sits as they try to figure out what could be wrong with a Mac after three logic boards and two hard drives, power supplies, video cards, and SCSI cables.

My attempts to get Apple to replace it have been frustrating. Apple's customer-support representative said it was up to the store that sold it to replace it; Campus Software said that it has no return policy because Apple doesn't give the company any return for replaced merchandise, and that it's Apple's responsibility to replace the machine, and told me to call customer support. What do I do?

RUSSELL ZACK
Ann Arbor, Michigan

A week after Mr. Zack's plea to Macworld, *Apple Computer technicians finally figured out the cause of his troubles: a bad SCSI cable from a third-party vendor's hard drive.*

So what could he have done differently? Consider a couple of strategies Macworld *has gleaned from years of tech-support testing. When things go wrong, first ask yourself, Have I added any hardware recently? Software? Have I changed any System settings? "Troubleshooting Tips and Tools"* (Macworld, *April 1994) gives advice on resolving extension conflicts (use an extension manager like the one included in System 7 or a stand-alone program like Casady & Greene's Conflict Catcher 3.0); software incompatibilities (use a compatibility checker such as Technosys's Help, and actually read Read Me files for known incompatibilities); and SCSI conflicts (always check a new drive with no other devices on the chain, and keep your fingers crossed). If you suspect a recent addition could be the cause of your troubles, remove it and see if that also removes the problem. If you call tech support, be ready to provide technicians with details of your system—programs like Tech Support TimeSaver ($5, Jim Stephenson; available on the Web at* **http://www.macworld.com** *and on AOL, keyword* **Macworld***) are a handy way to keep tech-support numbers, policies, registration numbers, system configuration, and notes all in one place. And if you don't like the support, call at a different time of day and speak to someone else. Or try a local user group or online service for ideas (see* Conspicuous Consumer, *October 1995).*

If you absolutely can't resolve the problem with your current reseller, take your business to another authorized reseller or even a nonauthorized reseller (see PowerBook Notes, *April 1995). Apple products—from CPUs to mice—have a one-year warranty against defect, but you must prove the fault lies with Apple's equipment. Ask your credit card company—provided you paid with a credit card, and we recommend that you do—for help. You can also lodge a complaint with the Better Business Bureau; but neither the BBB, nor any government agency, can get your money back for you.*

—SUZANNE COURTEAU

Service HERO

This month's service hero is a technical-support manager who was so horrified when he heard that a customer didn't get his calls returned that he replaced the customer's $400 product without charge.

Gene M. Boeninger of Delray Beach, Florida, writes that he purchased a Visioneer Paperport scanner at a Computer City clearance sale. He used it for several weeks without problems—until it suddenly began freezing his Macintosh, requiring him to force quit. He called Visioneer tech support, explained the problem to a technician, and was told to expect a return call. It never came. He called again and received the same response, and again a third time.

"I wrote Visioneer a letter complaining about the lack of technical support . . . and then forgot about it." Boeninger went off in search of another scanner. Before he could make the purchase, however, Visioneer's manager of technical support, Paul Sterngold, "called me and apologized profusely for the snafus. [He said] because they stand behind their products, he was sending me, at their expense, a new Paperport at no cost to me. He even gave me his private phone number in case I have further problems. I was flabbergasted."

Macworld contributing editor TOM NEGRINO is coauthor (with fellow contributing editor Charles Seiter) of *Macworld Essential Web Secrets* (IDG Books Worldwide, 1995). m

Not getting the treatment you deserve? Or have you received heroic service? Write to the *Consumer Advocate* department at *Macworld*, 501 Second St., San Francisco, CA 94107; send us a fax at 415/442-0766; or E-mail us at **macworld@macworld.com**. Look for us on America Online (keyword **Macworld**) and on the World Wide Web (**http://www.macworld.com**).

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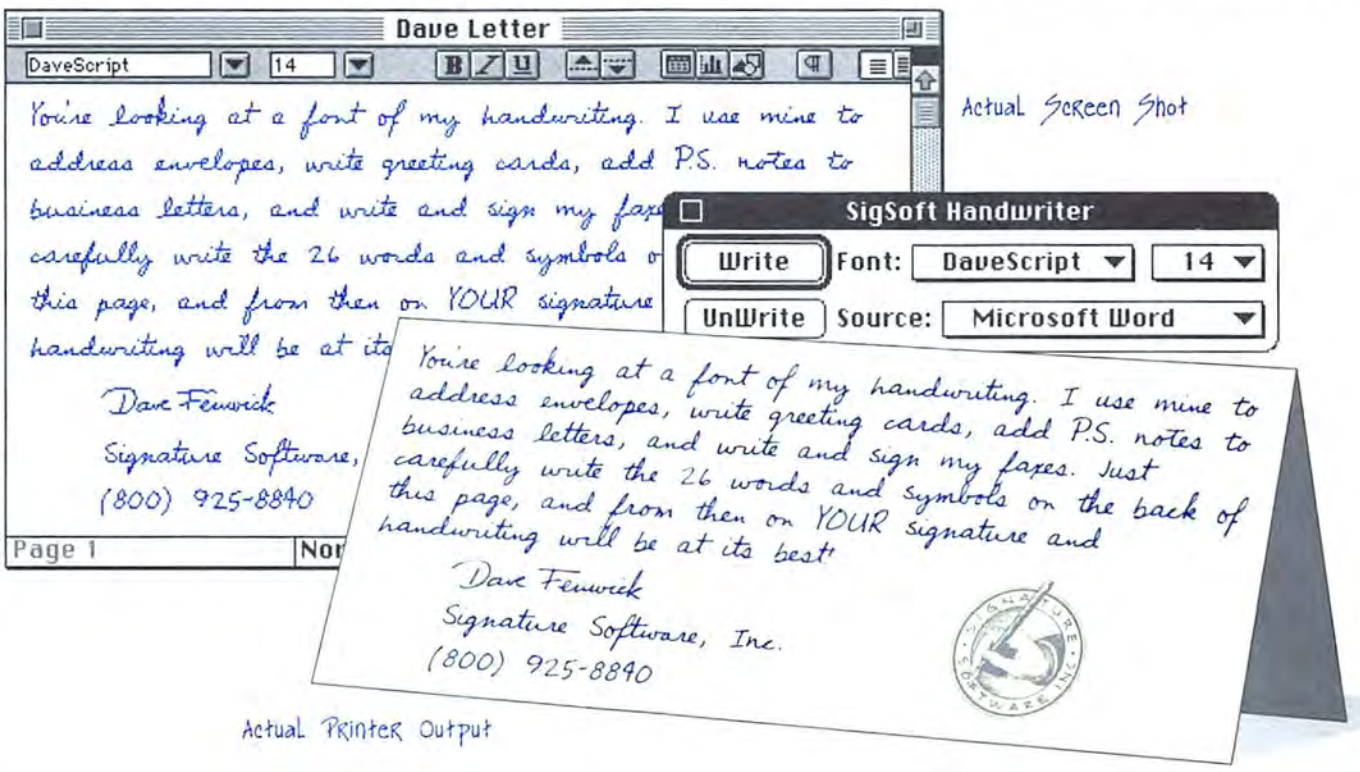
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3. Write naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rollerball or fibertip pen. **Do not use ballpoint pens or pencils!**
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.

kagvels

6. Write your capitals normally. Consider the appearance of capitals when used at the beginning of words AND when words are all capitalized. **Don't forget the punctuation!**
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Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword **Macworld** on America Online; URL **http://www.macworld.com** on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

software

BUSINESS TOOLS

★★ **Adobe Acrobat 2.0,** Adobe Systems, 415/961-4400, $195. The font fidelity of this portable-document software is uneven. *Mar 95, p. 59*

★★★ **Adobe Acrobat for Workgroups 2.0,** Adobe Systems, 415/961-4400, $1595. Portable-document software for workgroups is inexpensive but resource-intensive. *Mar 95, p. 59*

★★★★ **ArcView 2.1,** Environmental Systems Research Institute, 909/793-2853, ext. 2050, $995. Sophisticated GIS program is easy to customize. *Jan 96, p. 55*

★★★★ **BizPlan Builder 5.0,** Jian, 415/254-5600, $129. Easy-to-use spreadsheet/word processor template creates business plans. *Jun 95, p. 61*

★★★ **Business Plan Writer 6.0,** Graphite Software, 301/984-1100, $99. Proposal-writing template helps create a detailed business plan. *Jun 95, p. 61*

★★★★ **ClarisWorks 4.0,** Claris, 408/727-8227, $129. Integrated program's word processor and database are superb. *Oct 95, p. 62*

★★★★★ **DeltaGraph Pro 3.5,** DeltaPoint, 408/648-4000, $195. Easy-to-use graphing software stands out from the pack. *Jan 96, p. 57*

★★★ **Equate 1.0,** Holosoft, 408/748-9648, $99. Newton spreadsheet is compatible with Excel. *Oct 95, p. 85*

★★★★ **Helix Express 3.03,** Helix Technologies, 708/465-0242, $589. Latest release of visually oriented database adds speed and features. *Sep 95, p. 65*

★★★★ **MapInfo 3.0,** MapInfo, 518/285-6000, $1295. Mapping software includes advanced geographic-analysis and geocoding tools. *Oct 95, p. 66*

★★★ **Meeting Maker XP 3.1,** On Technology, 617/374-1400, $249; $890 for 10 users. Group scheduling program is useful for small and midsize businesses. *Jan 96, p. 69*

★★★ **PhoneDisc 95 PowerFinder,** Digital Directory Assistance, 617/639-2900, $249. CD-ROM-based phone directory is convenient but must be updated periodically. *Oct 95, p. 91*

★★★ **Phyla 1.0.3,** Mainstay, 805/484-9400, $495. While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. *Aug 95, p. 85*

★★★ **QuickFigure Pro 2.1,** PelicanWare, 503/221-1148, $49.95. Newton spreadsheet includes charting and linear-equation solving. *Oct 95, p. 85*

COMMUNICATIONS/NETWORKS

★★★★ **Apple Mobile Message System,** Apple Computer, 408/996-1010, $549; $19.95 per month. Multifaceted remote-messaging service helps you keep in touch. *Sep 95, p. 74*

★★★★ **ASAP 1.5,** MicroBeam, 813/546-2727, $695; $795 with Windows client program. Convenient utility makes file-transfer operations quick and easy. *Sep 95, p. 72*

★★★ **Claris Emailer 1.0,** Claris, 408/727-8227, $89. E-mail–management program offers impressive features at a good price. *Dec 95, p. 62*

★★★ **CreativePartner,** emotion Inc., 415/812-9000, $1500. Collaboration tool distributes video, sound, text, and graphics over a network. *Jul 95, p. 69*

★★★★ **FileWave 2.1.2,** Wave Research, 510/704-3900, $895. Update LAN users with this easy-to-use software-distribution tool. *Jul 95, p. 63*

★★★ **GrabNet 1.0,** ForeFront Group, 713/961-1101, $19.95. Simple, affordable utility captures Web pages. *Nov 95, p. 85*

★★ **HoloGate 1.0,** Information Access Technologies, 510/704-0160, $500. E-mail gateway is price-rich and feature-poor. *Apr 95, p. 71*

★★★★ **MacAdministrator,** Hi Resolution, 508/463-6956, $395 (10-user pack). Group administration tool is a great helper for network administrators. *Dec 95, p. 75*

★★★★ **Netscape Navigator,** Netscape Communications, 415/528-2555, $39. Web browser is ahead of the pack in terms of features and ease of use. *May 95, p. 69*

★★★★ **NetWorks 3.0.4,** Caravelle Networks, 613/225-1172, $1395 to $2495. Network-monitoring utility is an indispensable tool. *Apr 95, p. 85*

★★★★ **ProTerm Mac 1.0,** InTrec Software, 602/992-5515, $129.95. Communications program is fast, reliable, and stable. *Jul 95, p. 71*

★★★ **RunShare,** Run, Inc., 201/529-4600, $199 to $2499. System extension endeavors to pump up file-transfer speeds across networks. *Feb 95, p. 85*

★★★ **Saber LAN Workstation,** Saber Software, 214/361-8086, $199 plus $49 per node. LAN-management package is a useful tool for the price. *Aug 95, p. 73*

★★★★ **Skyline/Satellite,** AG Group, 510/937-7900, 1-station pack $795; 5-station pack $1195; 10-station pack $1995. Remote monitoring engines keep an eye on LAN traffic. *Sep 95, p. 74*

★★★ **SnapMail 2,** Casady & Greene, 408/484-9228, $250 (5 users); $420 (10 users); $1940 (50 users). E-mail software is easy to install, but its gateway interface is kludgy. *Dec 95, p. 75*

★★★★ **Snatcher 1.0,** Software Ventures, 510/644-3232, $49.95. Simple, efficient FTP tool lets you connect to multiple sites simultaneously. *Aug 95, p. 81*

★★ **TurboTalk 1.0,** Information Presentation Technologies, 805/541-3000, $160 to $495. Network utility's performance is unimpressive on some network configurations. *Oct 95, p. 83*

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0,** Adobe Systems, 206/622-5500, $895. Page-layout program's upgrade includes practical and powerful improvements. *Nov 95, p. 60*

★★★ **ColorDrive 1.0,** Pantone, 201/935-5500, $199. Color-management software supports a broad range of color models. *Nov 95, p. 70*

★★★ **Download Mechanic 1.0.2 (1.5),** Acquired Knowledge, 619/587-4668, $249. PostScript downloader performs well but can be slow with large files. *Feb 95, p. 77*

★★★★ **FrameMaker 5.0,** Frame Technology, 408/

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Star Ratings

975-6000, $895. Page-layout program is a good choice for technical documents. *Nov 95, p. 63*

★ **HoTMetal Pro 2.0,** SoftQuad, 416/239-4801, $195. Web authoring software is hampered by a poorly designed interface. *Jan 96, p. 65*

★★★★ **Icefields 2.3,** The Color Partnership, 619/259-8688, $895. Professional printers will appreciate this stochastic-screening software. *Nov 95, p. 75*

★★★★ **Let'er RIP 2.0 (2.0.1),** Lupin Software, 916/756-7267, $239. PostScript downloader is cleanly implemented and flexible. *Feb 95, p. 77*

★★★★ **theTypeBook 4.0,** Rascal Software, 805/255-6823, $59.95. Customizable type-specimen generator is a worthwhile purchase. *Jun 95, p. 73*

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1,** EA World, 415/571-7171, $79.95. Well-designed atlas enriches map data with narration, photos, and movies. *May 95, p. 73*

★★★★★ **A.D.A.M. The Inside Story,** A.D.A.M. Software, 404/980-0888, $79.95. Stunning multimedia CD-ROM teaches basic anatomy and physiology. *Mar 95, p. 81*

★★★ **AmoebArena 1.0,** Casady & Greene, 408/484-9228, $49.95. Engaging strategy game pits amoeboid against amoeboid. *Jan 96, p. 75*

★★★ **CyberBoogie,** Times Mirror Multimedia, 314/531-2503, $49.95. Cute animation software is a good choice for very young kids. *Apr 95, p. 89*

★★★★ **The Daedalus Encounter,** Virgin Interactive Entertainment, 714/833-8710, $59.95. Escape from a doomed spacecraft in this interactive adventure. *Sep 95, p. 73*

★★★ **Digital Chisel 1.2,** Pierian Spring Software, 503/222-2044; $199.95, site license $995. Authoring tool creates good interactive quizzes but suffers from a nonstandard interface. *Jun 95, p. 71*

★★★ **French Assistant for Macintosh 1.0,** Globalink, 703/273-5600, $59.95. Translation software is easy to use and inexpensive, but slow. *Mar 95, p. 69*

★★★ **FrenchNow 3.0,** Transparent Language, 603/465-2230, $99 to $129. While it doesn't replace a class, software can help you learn French. *Dec 95, p. 83*

★★★★ **Full Throttle,** LucasArts, 415/472-3400, $49.95. Biker adventure game is witty and action-packed. *Jan 96, p. 73*

★★ **Haight-Ashbury in the Sixties,** Compton's NewMedia, 619/939-2500, $49.95. If you can remember the sixties, you probably don't need this CD-ROM. *Dec 95, p. 84*

★★★ **Kids World,** Bit Jugglers, 415/968-3908, $30. Screen-saver-creation tool for kids is clever, but its painting tools are deficient. *Mar 95, p. 83*

★★★ **King's Quest VII: The Princeless Bride,** Sierra Online, 206/649-9800, $59.95. Adventure game is entertaining, but adults might find its plot silly. *Jan 96, p. 75*

★★★ **The Legend of Kyrandia, Book 3,** Virgin Interactive Entertainment, 714/833-1999, $34.95. Enjoyable adventure game features good graphics and sound. *Jan 96, p. 77*

★★★★ **Links Pro CD,** Access Software, 801/359-2900, $69.95. An excellent simulation of golf's many challenges. *Jan 96, p. 73*

★★★★ **The Lost Mind of Dr. Brain,** Sierra On-Line, 206/649-9800, $44.95. Hilarious brainteasers are presented in an imaginative, arcade style. *Oct 95, p. 93*

★★★★ **Material World,** StarPress Multimedia, 415/274-8383, $59.95. Multimedia CD-ROM provides a fascinating look at diverse cultures. *Jun 95, p. 83*

★★★★ **Math Workshop,** Broderbund Software, 415/382-4700, $40. Youngsters can have some fun while learning math. *Aug 95, p. 89*

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM,** Merriam-Webster, 413/734-3134, $69.95. Powerful search capabilities don't make up for this dictionary's interface flaws. *Nov 95, p. 79*

★★★★ **Nile: Passage to Egypt,** Discovery Channel Multimedia, 301/986-1999, $49.95. Armchair adventurers will enjoy this multimedia journey on CD-ROM. *Oct 95, p. 93*

★★★ **Out of the Sun,** Domark software, 415/513-8929, $44.95. Flight-simulation game presents historic or custom battle scenarios. *Jan 96, p. 77*

★★★★★ **Passage to Vietnam,** Against All Odds Productions/Interval, 800/558-3388, dept. 100, $39.95 to $59.95. Stunning photojournalism CD-ROM sets a new standard for multimedia projects. *Dec 95, p. 83*

★★★ **Power Translator for Macintosh 2.0,** Globalink, 703/273-5600, $249. Translation software quickly produces results suitable for first drafts. *Mar 95, p. 69*

★★★ **Small Blue Planet 2.0 (2.0.1),** Now What? Software, 415/885-1689. $59.95. The satellite photos of this atlas are truly dazzling, although the interface is less than world class. *May 95, p. 73*

★★★★ **Storybook Weaver Deluxe 1.0,** MECC, 612/569-1500, $69.95. Well-designed program lets kids create their own storybooks. *May 95, p. 83*

★★★★ **Theorist 2.0,** Waterloo Maple Software, 519/747-2373, $299. Symbolic-math program is a great learning aid for students. *Jun 95, p. 79*

★★★★ **WarPlanes 1.0,** Maris Software, 800/336-0185, $69. Wonderful multimedia CD-ROM explores post-WWII military aviation. *Mar 95, p. 81*

★★★★ **Widget Workshop,** Maxis Software, 510/254-9700, $44.95. Clever mad scientist's lab encourages imagination and exploration. *Apr 95, p. 89*

FINANCE/ACCOUNTING

★★★★ **Managing Your Money 7.0,** MECA Software, 203/255-1441, $79.95. Personal financial software includes advanced investment features. *Oct 95, p. 81*

★★★★ **M.Y.O.B. 5.0,** BestWare, 201/586-2200, $139; $239 w/payroll. Well-designed interface makes double-entry accounting easy. *May 95, p. 63*

★★★ **QuickBooks 3.0,** Intuit, 415/322-0573, $119. Double-entry accounting program is easy to use but not entirely Mac-like. *Jun 95, p. 58*

★★★★ **Quicken 5.0,** Intuit, 415/322-0573, $49.95. A calendar and new ease-of-use features keep this personal finance software comfortably ahead of the pack. This upgrade is an incremental, but still welcome, improvement over an already excellent product. *Feb 95, p. 71*

★★★ **StreetSmart 1.0,** Charles Schwab & Company, 800/334-4455, $59. If you have an account with Schwab, consider this investment software. *Feb 95, p. 59*

GRAPHICS

★★★ **AddDepth 2.0,** Ray Dream, 415/960-0768, $99. 3-D effects software provides a simple way to give depth to illustrations. *Nov 95, p. 81*

★★★★ **Adobe Dimensions 2.0,** Adobe Systems, 415/961-4400, $199. 3-D effects software has added color support plus drawing and text tools. *Apr 95, p. 71*

★★★ **Adobe TextureMaker 1.0 (2.0),** Adobe Systems, 415/961-4400, $199. Texture generator creates backgrounds for multimedia or printed projects. *Oct 95, p. 89*

★★★ **Alien Skin Textureshop 1.0,** Virtus, 919/467-9700, $99. Apply random mutations to master textures to create custom patterns. *Jul 95, p. 81*

★★ **Art Explorer 1.0,** Aldus Consumer Division, 206/628-2749, $49.95. Paint/draw program for kids is fun but rough around the edges. *Feb 95, p. 65*

★★★ **Black Box 2.0,** Alien Skin Software, 919/832-4124, $119. Photoshop image filters are useful and worth their modest price. *Nov 95, p. 87*

★★★ **CD-Q 2.0,** Human Software, 408/741-5101, $145. Photoshop plug-in facilitates color corrections and separations on Photo CDs. *Jul 95, p. 65*

★★★★ **Color It 3.0,** MicroFrontier, 515/270-8109, $149.95. Venerable paint program has been updated with powerful new features. *Aug 95, p. 75*

★★★ **Colorize 2.0,** DS Design, 919/319-1770, $495. Colorizing software is effective but expensive for a one-trick pony. *Dec 95, p. 81*

★★ **FloorPlan Plus 1.1,** ComputerEasy International, 602/829-9614, $49.95. Affordable 2-D CAD program is intended for rudimentary design tasks. *Sep 95, p. 85*

★★★ **Flying Colors,** Davidson & Associates, 310/793-0600, $59.95. Paint/draw program provides easy-to-use tools for ages 8 to adult. *Feb 95, p. 65*

★★★★★ **Fractal Design Painter 3 (3.1),** Fractal Design, 408/688-8800, $499. Image-creation program has achieved a rare state of perfection. *Apr 95, p. 56*

★★★ **FullPixelSearch 1.5,** Avian Systems, 201/224-2025, $1295. Analyze scientific images with a variety of pixel-selection functions. *Jul 95, p. 79*

★★★ **Gryphon Batch It 1.0,** Gryphon Software, 619/536-8815, $199. Although it lacks conditional statements, batch processor is a time-saver. *Jun 95, p. 67*

★★★★ **Infini-D 3.0,** Specular International, 413/253-3100, $899. 3-D software does professional-quality rendering and animation. *Jan 96, p. 54*

★★★ **Intellihance 1.0,** DPA Software, 214/517-6876, $129 to $299. Photoshop plug-in automates the process of improving scanned graphics. *Sep 95, p. 71*

★★★★ **KPT Convolver 1.0,** MetaTools, 805/566-6200, $199. Imaginative and absorbing plug-in module creates Photoshop filters. *Aug 95, p. 71*

★★★★ **KPT Vector Effects 1.0,** MetaTools, 805/566-6200, $199. Helpful Illustrator and FreeHand filters have an inspired interface. *Oct 95, p. 72*

★★★★ **Live Picture 2.0,** MetaTools, 805/566-6200, $995. Latest version of this innovative image editor boasts many improvements. *Sep 95, p. 62*

★★★★ **MacDraft 4.0,** Innovative Data Design, 510/680-6818, $449. Excellent 2-D CAD program has links to Excel and a clean interface. *Mar 95, p. 79*

★★★★ **MacPhase 2.0,** The Otter Solution, 315/768-3956, $279. Feature-rich program offers scientific and graphics image processing tools. *Aug 95, p. 85*

★★★ **MovieFlo' 1.1,** The Valis Group, 415/435-5404, $899. Tug, twist, and pinch images with this special-effects program. *Jun 95, p. 60*

★★★★ **Paint Alchemy 2.0,** Xaos Tools, 415/487-7000, $199. Flexible image editor is an appealing add-on for digital artists. *Sep 95, p. 70*

★★★★ **PhotoEnhancer 1.0,** PictureWorks, 510/855-2001, $129. Nifty utility improves the quality of QuickTake photos. *Apr 95, p. 65*

★★★ **PhotoFix 2.8.8,** Microspot USA, 408/253-2000, $249. Image-editing/photo-enhancement program is a useful tool. *Sep 95, p. 81*

★★★ **PhotoFlash 2.0,** Apple Computer, 408/996-1010, $129. Image-editing utility provides basic

image-retouching tools at a reasonable price. *Jul 95, p. 67*

★★ **PhotoFusion 2.0.3,** Ultimate, 818/993-8007, $695. Photoshop compositing plug-in is hampered by a poor interface. *Oct 95, p. 83*

★★★★ **Pixar Typestry 2.1,** Pixar, 510/236-4000, $299. 3-D type effects software adds a new dimension to digital type. *Feb 95, p. 89*

★★★★ **PixelPaint Pro 3.01,** Pixel Resources, 404/449-4947, $379. Color paint program offers professional-level painting and image processing tools. *Mar 95, p. 55*

★★★ **PixelPutty Solo (1.5),** The Valis Group, 415/435-5404, $399. Affordable modeler lets you manipulate 3-D objects as if they were clay. *Jun 95, p. 77*

★★★★ **Poser 1.0,** Fractal Design, 408/668-5300, $199. 3-D illustration tool generates posable human figures. *Oct 95, p. 63*

★★★★ **PowerCADD 2.0,** Engineered Software, 910/299-4843, $795. CAD program features exceptional speed and an extensive array of tools. *Oct 95, p. 77*

★★★ **Ray Dream Designer 3.1.1,** Ray Dream, 415/960-0768, $349. 3-D graphics program provides competent modeling tools and excellent rendering. *Mar 95, p. 61*

★★ **Select 1.6,** Human Software, 408/741-5101, $245. CMYK color-correction plug-in duplicates many Photoshop functions. *Jul 95, p. 81*

★★★★ **SmartSketch 1.0,** FutureWave Software, 619/637-6190, $69.95. Innovative, easy-to-use graphics program unites painting and drawing. *Sep 95, p. 58*

★★★ **Specular Collage 2.0.1,** Specular International, 413/253-3100, $399. Serviceable image-compositing software has a smooth interface and strong Photoshop support. *Feb 95, p. 54*

★★★★ **TextureScape 1.5,** Specular International, 413/253-3100, $195. Algorithmic art program arranges PostScript shapes to create seamless patterns. *Feb 95, p. 87*

★★★★ **Transverter Pro 3.0,** TechPool Studios, 216/382-1234, $395. Graphics-conversion tool deserves a place in every desktop publisher's toolbox. *Nov 95, p. 77*

★★★ **Virtus WalkThrough Pro 2.0,** Virtus, 919/467-9700, $495. Aside from occasional stumbles, this 3-D design tool is an exceptional program. *Apr 95, p. 59*

★★★★ **Vision 3d 4.0,** Strata, 801/628-5218, $695. 3-D modeling, rendering, and animation package offers excellent tools. *Jul 95, p. 56*

★★★ **Vistapro 3.0,** Virtual Reality Laboratories, 805/545-8515, $149.95. 3-D landscape-rendering software bases images on USGS maps. *Feb 95, p. 77*

★★★ **Working Model,** Visual Basic, 415/574 7777, $2495. Motion-simulation system is a fine product, but a Power Mac version is needed. *Dec 95, p. 79*

★★ **xRes 1.11,** Fauve Software, 415/543-7178, $799. Image editor applies a variety of effects to selected areas of a large composition. *Jul 95, p. 60*

MATH/SCIENCE

★★★★ **The Fuzzy Logic Toolbox 1.0,** MathWorks, 508/653-1415, $895. Math-simulation aid incorporates fuzzy logic into models. *Sep 95, p. 89*

★★★★ **LabView 3.1,** National Instruments, 512/794-0100, $1995. Instrumentation software can emulate most scientific and electronic test-bench instruments. *Nov 95, p. 62*

★★★★ **MLab,** Civilized Software, 301/652-4714, $1495. Mathematical-modeling software does fast computations on real-world problems. *Apr 95, p. 83*

★★★★ **Statistica/Mac 4.1,** StatSoft, 918/583-4149, $695. Statistical software is the undisputed features-per-dollar champion. *Mar 95, p. 79*

★★★★ **Survival Tools 1.0 (1.1),** Abacus Concepts, 510/540-1949, $295. Survival-analysis software offers a great set of tools, conveniently packaged. *Feb 95, p. 83*

ORGANIZATION/PRODUCTIVITY

★★★ **ACT 2.0,** Symantec, 503/334-6054, $249.95. Contact manager has well-implemented contact fields but weak scheduling functions. *Mar 95, p. 77*

★★ **ClienTrac 2.0,** Whiskey Hill Software, 415/851-8702, $99. PIM is easy to use but slim on speed, features, and flexibility. *May 95, p. 75*

★★★ **Day-to-Day Organizer 1.0,** Portfolio Software, 802/434-6400, $149.95. Some components of this organizer are great, but others need work. *May 95, p. 61*

★★★ **Expresso 1.0,** Berkeley Systems, 510/540-5535, $69.99. Calendar program is attractive and easy to use but its address book is weak. *Apr 95, p. 73*

★★★ **FastTrack Schedule 3.0,** AEC Software, 703/450-1980, $299. Updated version of this project planner includes customizable features. *Aug 95, p. 79*

★★★★ **In Control for Workgroups 3.5,** Attain, 617/776-1110, $149.95; 10-pack $949.95. Flexible project planner/scheduler combines an outliner and a calendar. *Sep 95, p. 93*

★★★ **InfoGenie 1.0.5,** Casady & Greene, 408/484-9228, $79.95. Free-form data manager is appealing but lacks some of the competition's features. *Nov 95, p. 87*

★★★ **InTouch 2.5,** Prairie Group, 515/225-3720, $69.95. Free-form contact manager offers speedy access to information. *Sep 95, p. 69*

★★★★ **Now Up-to-Date and Contact 3.5,** Now Software, 503/274-2800, $99. Calendar/address book combo features several enhancements. *Nov 95, p. 68*

★★ **Peanuts Family Organizer 1.0,** Individual Software, 510/734-6767, $19.95. Organizer's endearing interface doesn't make up for missing features. *Jun 95, p. 81*

PRESENTATION TOOLS

★★★★ **Authorware Professional 3.0,** Macromedia, 415/252-2000, $4995. Multimedia authoring program is feature-packed but costly. *Dec 95, p. 66*

★★★ **CyberSound FX 1.0,** InVision Interactive, 415/812-7380, $129. Plug-ins for Premiere make audio more polished, but access is cumbersome. *Nov 95, p. 91*

★★★ **Electronic Marker 1.0.2,** Consumer Technology Northwest, 503/643-1662, $34.95. Annotation tool can enhance demonstrations but needs better layer tools. *May 95, p. 71*

★★★ **HyperCard 2.3,** Apple Computer, 408/996-1010, $129. Authoring tool is an inexpensive solution for multimedia developers. *Nov 95, p. 66*

★★ **Living Album 2.5,** QuickMedia Labs, 408/749-9200, $129.95. Multimedia album is hampered by a crowded interface. *May 95, p. 81*

★ **MediaFactory 1.0,** Nuts Technologies, 408/980-7800, $199. Entry-level QuickTime movie editor has an awkward interface. *Nov 95, p. 89*

★★★★ **MediaPaint 1.0,** Strata, 801/628-5218, $695. QuickTime paint program lets multimedia developers edit ranges of frames. *Sep 95, p. 56*

★★★ **Microsoft PowerPoint 4.0,** Microsoft, 206/882-8080, $339. Presentation-graphics program is a good choice to use along with Word or Excel. *Feb 95, p. 67*

★★ **mPower 2.0,** Multimedia Design, 704/523-9493, $295. Multimedia authoring tool is too limited to be compelling. *Apr 95, p. 81*

★★★★ **Presenter Professional 3.0,** VIDI, 818/358-3936, $1995. 3-D modeling/animation package is an excellent choice for multimedia producers. *May 95, p. 59*

★★ **Special Delivery 2.0,** Interactive Media, 415/948-0745, $399. Multimedia authoring tool isn't the best choice for complex projects. *Apr 95, p. 79*

★★★★ **SuperCard 1.7.1 (2.0),** Allegiant Technologies, 619/587-0500, $495. Multimedia authoring system adds enhancements and squashes some old bugs. *Feb 95, p. 68*

★★★★ **TransJammer,** Elastic Reality, 608/273-6585, $99. Plug-in for Premiere and VideoShop offers 100 video-transition effects. *Aug 95, p. 83*

PROGRAMMING

★★★★ **AppWare 1.2,** Novell, 801/429-7000, $495. Development system features an easy-to-use graphical programming method. *Oct 95, p. 68*

★★★★ **FaceSpan 2.0,** Software Designs Unlimited, 214/578-6700, $199. AppleScript interface builder lets developers create sophisticated applications. *Nov 95, p. 64*

★★★★ **JAM 6,** JYACC, 212/267-7722, $2000. Development tools enable creation of large-scale corporate client-server databases. *Oct 95, p. 70*

★★★ **Script Debugger 1.0,** Late Night Software, 604/929-5578, $129. Script-development software improves on AppleScript, except in the debugging department. *Nov 95, p. 85*

★★★ **Symantec C++ 8.0,** Symantec, 503/334-6054, $499. Compiler has been improved and expanded but demands lots of resources. *Jul 95, p. 62*

★★★★ **VIP-C 1.5 (1.5.1),** Mainstay, 805/484-9400, $495. Programming utility offers slick links to compilers, transparent Power Mac development. *Feb 95, p. 85*

UTILITIES

★★ **Adobe ScreenReady 1.0,** Adobe Systems, 415/961-4400, $199. PostScript image rasterizer can aid multimedia developers but has flaws. *Dec 95, p. 71*

★★★ **Aladdin Desktop Tools 1.0,** Aladdin Systems, 408/761-6200, $89.95. Utilities collection is uneven but a worthwhile buy. *Aug 95, p. 69*

★★★ **Arcserve for Macintosh 1.5,** Cheyenne Software, 516/484-5110, $245 (5 users); $495 (20 users). A good backup program for mixed-platform networks. *Jan 96, p. 63*

★★★★ **At Ease 3.0 for Workgroups,** Apple Computer, 408/996-1010, $295. Desktop alternative is a handy tool for network administrators. *Nov 95, p. 83*

★★★★ **BeyondPress 1.0,** Astrobyte LC, 303/534-6344, $595. QuarkXPress Xtension is a great way to convert documents to Web pages. *Dec 95, p. 73*

★★★ **CanOpener 3.0,** Abbott Systems, 914/747-4171, $125. Utility opens many types of files but falls short in file-search department. *May 95, p. 67*

★★★★ **CD Directory 1.0,** Insignia Solutions, 415/694-7600, $69.95. Utility stores catalogs of CD directories on a hard drive. *Jul 95, p. 73*

★★★ **Color Compass 1.0,** Praxisoft, 703/729-3391, $129. Speedy, specialized tools blend, match, and tweak colors. *Aug 95, p. 77*

★★★★★ **Conflict Catcher 3,** Casady & Greene, 408/

continues

Star Ratings

484-9228, $99.95. Extension-management utility offers a friendly, flexible approach to conflict resolution. *Sep 95, p. 69*

★★★★ **Disc-To-Disk,** Optical Media International, 408/376-3511, $199. Audio-capture utility is a useful tool for multimedia authors. *Jun 95, p. 69*

★★★★ **DiskGuard 1.0.1 and DiskGuard Remote,** ASD Software, 909/624-2594, $129 to $799. Rock-solid, flexible disk-protection tools are worth serious consideration. *Mar 95, p. 75*

★★★ **DragStrip 1.0,** Natural Intelligence, 617/876-4876, $39.95. Icon-based file and folder organizer brings order to cluttered desktops. *May 95, p. 79*

★★★ **File Genie Pro 1.1,** Duet Development, 408/559-3838, $89. Disk- and file-management utility is fast but has limited search and sort criteria. *Oct 95, p. 87*

★★★★ **FolderBolt Pro 1.0.3,** Kent Marsh, 713/522-5625, $129.95. Top-notch encryption schemes secure your Mac's contents. *Jul 95, p. 77*

★★★ **Gear 2.5,** Elektroson, 610/617-0850, $799. CD-recordable mastering software is a mixed bag. *Sep 95, p. 91*

★★★★ **Graffiti 1.01,** Palm Computing, 415/949-9560, $79. Teach yourself a new writing system that Newton can handle. *May 95, p. 77*

★★★ **Here & Now 1.0,** Software Architects, 206/487-0122, $89.95. File-transfer utility facilitates putting a Mac disk in a PC. *Nov 95, p. 81*

★★★★ **InstantReplay 1.0,** Strata, 801/628-5218, $149. Utility records on-screen activity and saves it as a QuickTime movie. *Sep 95, p. 89*

★★★★ **Kaboom 3.0,** Nova Development, 818/591-9600, $49.95. Sound-effects utility with sound-editing application is a fun program. *Feb 95, p. 89*

★★★ **MacTools Pro 4.0,** Symantec, 503/690-8090, $149.95. This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. *May 95, p. 73*

★★★ **Menu Master Mac,** Electronic Learning Systems, 904/375-0558, $99; 15-site license $299. Security software is useful but could use some additional features. *Sep 95, p. 95*

★★★★ **MultiClip Pro 3.1,** Olduvai, 305/670-1112, $59. Utility is what Apple's Clipboard and Scrapbook should have been. *Apr 95, p. 67*

★★★ **Multimedia Utilities 1.1,** Motion Works, 415/541-9333, $299. 6 appealing utilities address QuickTime moviemaking. *Jul 95, p. 71*

★★★★ **Norton DiskDoublerPro 1.1,** Symantec, 503/334-6054, $109. File-compression utility is fast and efficient. *Feb 95, p. 73*

★★★ **Norton Utilities for Macintosh 3.1,** Symantec, 503/334-6054, $149.95. Utilities suite features strong disk repair and data recovery but weak backup. *Feb 95, p. 63*

★★★ **On Cue II Utilities 3.0,** ComputerEasy International, 602/829-9614, $99.95. Eight utilities add functionality to the Mac Operating System. *Sep 95, p. 93*

★★★★ **OptiMem RAM Charger 2.0.1,** Jump Development Group, 412/681-2692, $129. Use RAM more efficiently with this memory-management utility. *Jul 95, p. 75*

★★★ **PaperPower 1.0,** Piptel, 513/294-6656, $149. Graphics-tablet utility is useful for macros, but its overlays can be tricky. *Apr 95, p. 87*

★★★★ **Power Secretary Power Edition 2.0,** Articulate Systems, 617/935-5656, $2495. Speech-recognition program learns your voice patterns as you use it. *Sep 95, p. 60*

★★★ **RapidCD 1.04,** Insignia Solutions, 415/694-7600, $69.95. Utility provides speedy access to frequently used data on CD-ROM. *Jul 95, p. 73*

★★★ **RescueTxt 1.0,** Abbott Systems, 914/747-3116, $79. Text-retrieval utility works well but doesn't tell you the source file's name. *Apr 95, p. 83*

★★★★ **S/Link 2.0,** Synclavier, 603/448-8887, $249. Utility is a valuable aid for anyone who does audio file conversion. *Nov 95, p. 91*

★★★★ **StuffIt Deluxe 3.5,** Aladdin Systems, 408/761-6200, $129.95. If you're looking for a compression solution, this is it. *Mar 95, p. 69*

★★★★ **TypeTamer 1.0.4,** Impossible Software, 714/470-4800, $59.95. Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from the menu. *May 95, p. 77*

★★★ **ultraSecure 3.524,** usrEZ Software, 714/756-5140, $239. Security program offers a comprehensive set of protection tools. *Sep 95, p. 81*

★★★★ **Virex 5.5.1,** Datawatch, 508/988-9700, $99.95. Comprehensive, reliable, and speedy virus-detection utility helps protect files. *May 95, p. 65*

★★★ **Zonkers 1.0,** Nova Development, 818/591-9600, $19.95. Redecorate your Mac with a collection of silly desktop enhancements. *Aug 95, p. 89*

VERTICAL MARKETS

★★★ **Autoscore 1.0,** Wildcat Canyon Software, 510/527-5155, $150. Unique music software converts the human voice to MIDI information. *Feb 95, p. 87*

★★★ **ConcertWare 1.5.7,** Jump Software, 415/917-7460, $159. Music-notation program is affordable and easy to use but lacks features. *Jun 95, p. 75*

★★★ **DigiTrax 1.1,** Alaska Software, 408/738-3320, $349. Audio-recording software lacks some features but is easy to use. *Mar 95, p. 63*

★★★★ **FreeStyle 1.01,** Mark of the Unicorn, 617/576-2760, $200. Music sequencer with notation is a good choice for beginners. *Nov 95, p. 70*

★★★ **Insta Software,** Chang Labs, 408/727-8096, $29 per module. No-frills relational databases handle forms and record-keeping for businesses. *Aug 95, p. 77*

★★★ **MayaCalc 2.3.1 (2.3.3),** Ecological Linguistics, 202/546-5862, $120. Maya calendar calculator is a useful tool for Maya enthusiasts. *Feb 95, p. 79*

★★★★ **Maya Hieroglyphic Fonts,** Ecological Linguistics, 202/546-5862, $10 to $60 per set. Fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered. *Feb 95, p. 79*

★★★ **Medical HouseCall 1.0,** Applied Medical Informatics, 801/464-6200, $99.95. Interactive medical guide is a painless way to learn about diseases. *Feb 95, p. 75*

★★★★ **Nightingale 2.0,** TAP Music Systems, 206/462-1007, $495. Music-notation software is fast, feature-laden, and easy to learn. *Oct 95, p. 81*

★★★★ **Overture 1.02,** Opcode Systems, 415/856-3333, $495. Easy-to-learn music-notation software has a friendly interface. *Apr 95, p. 75*

★★★ **Performer 5.02,** Mark of the Unicorn, 617/576-2760, $495. MIDI recording program has been overhauled but is still hard to set up. *Mar 95, p. 65*

★★★ **Route 66 1.5,** Route 66 Geographic Information Systems B.V., 415/957-0666, $79.95. Route planner is fast but omits some cities. *May 95, p. 65*

★★★ **StoryBoard Artist 1.5,** PowerProduction Software, 310/937-4411, $499. Storyboard-creation software is useful but expensive. *Oct 95, p. 91*

★★★ **Vision 2.08,** Opcode Systems, 415/856-3333, $495. MIDI program's exclusive features give it a usability edge. *Mar 95, p. 65*

★★ **Visual Arranger 1.0,** Yamaha Corp. of America, 714/522-9240, $59.95. Song-building software is innovative, but replacing notation with icons doesn't work. *Nov 95, p. 89*

WRITING TOOLS

★★★★ **Bookends Pro 3.1,** Westing Software, 415/435-9343, $129. Comprehensive database program catalogs and stores reference material. *Mar 95, p. 73*

★★★★ **EndNote Plus 2.0,** Niles & Associates, 510/649-8176, $299. Indispensable bibliography and citation manager is easy to learn and use. *Apr 95, p. 77*

★★★ **FullWrite 2.01,** Akimbo Systems, 617/776-5500. $395. Although its modular architecture is complex, this word processor is worth considering. *Apr 95, p. 69*

★★★ **Grammatik 6 for Macintosh,** Novell, 801/225-5000, $49.95. Grammar checker has been improved but still misses some errors. *Feb 95, p. 83*

★★★ **Inspiration 4.1,** Inspiration Software, 503/245-9011, $195. Writing tool shows the relationships between ideas. *Apr 95, p. 75*

★★★ **Microsoft Word 6.0 (6.0.1),** Microsoft, 206/882-8080, $339. Word processor's many new features may benefit users with fast Macs. *Feb 95, p. 53*

★★★ **Nisus Writer 4.0,** Nisus Software, 619/481-1477, $495. Word processor excels in specialized areas but has flawed table editor. *Mar 95, p. 53*

★★ **Read-It O.C.R. Pro 5.0,** Olduvai, 305/670-1112, $395. OCR software has nice features but its recognition engine isn't up to par. *Apr 95, p. 79*

★★★ **Three by Five 2.0,** MacToolkit, 310/395-4242, $99. Idea organizer uses the metaphor of index cards on a corkboard. *Aug 95, p. 87*

hardware

INPUT DEVICES

★★★★ **ArtPad,** Wacom Technology, 360/750-8882, $199. Pressure-sensitive tablet is sheer convenience. *Apr 95, p. 67*

★★★★ **ArtZ II,** Wacom Technology, 360/750-8882, $389.99. Graphics tablet has unique stylus that erases as well as draws. *Dec 95, p. 79*

★★★ **ChoiceStick 1.0.2,** Kernel Productions, 302/456-3026, $69.95. Port lets you attach a pair of joysticks to a Mac. *Sep 95, p. 85*

★★★★ **DrawingSlate II,** CalComp, 602/948-6540, $395. Responsive digitizing tablet is an excellent choice for artists and illustrators. *Jun 95, p. 83*

★★★ **GlidePoint,** Alps Electric, 408/432-6000, $99. Alternative pointing device lets you position the cursor by moving your finger. *Jul 95, p. 77*

★★ **Jetstick,** CH Products, 619/598-2518, $74.95. Joystick's hardware is fine, but its manual and software are inadequate. *Sep 95, p. 95*

★★★ **MacAlly,** The Mace Group, 213/780-6110, $49. ADB mouse doesn't stand out from the crowd but is durable and affordable. *Jul 95, p. 75*

★★★ **Mouse Deluxe Mac,** MicroSpeed, 510/490-1403, $69. Mouse offers extra buttons, but its shape might not suit everyone. *Mar 95, p. 83*

★★★ **Mouse-Trak,** Itac Systems, 214/494-3073, $179. Input device is sturdy, but buttons can be hard to reach. *Nov 95, p. 83*

★★★★★ **PaperPort,** Visioneer, 415/812-6400, $399. Versatile scanner makes it easy to capture, organize, and retrieve documents. *May 95, p. 60*

★★ **Point Pad,** Hagiwara Sys-Com, 619/546-9989, $99. Pointing device is compact but can be awkward to use. *Oct 95, p. 87*

★★★ **QuePoint,** MicroQue, 801/263-1883, $149. Slide your finger across this tiny input device to manipulate the cursor. *May 95, p. 79*

★★★ **Remote Point,** InterLink Electronics, 805/484-1331, $199. Cordless pointing device is handy, but controlling objects onscreen can be hard. *Apr 95*

★★★★ **Thinking Mouse Macintosh ADB,** Kensington Microware, 415/572-2700, $139.95. Mouse has 4 programmable buttons that can automate tasks. *May 95, p. 83*

★★★ **Trackball Pro ADB,** CH Products, 619/598-2518, $119.95. Inexpensive trackball falls short in programmability and functionality. *Sep 95, p. 91*

MISCELLANEOUS HARDWARE

★★★ **Apple PCMCIA Expansion Module,** Apple Computer, 408/996-1010, $219. PowerBook expansion module is well designed but expensive. *Mar 95, p. 57*

★★★★ **Colortron,** Light Source Computer Images, 415/925-4200, $1195. Hand-held spectrophotometer helps match on-screen and printed colors. *Jun 95, p. 56*

★★★★ **DayStar PowerPro 601/DayStar Turbo 601,** DayStar Digital, 404/967-2077, PowerPro 601 $1599; Turbo 601 $1499. Impressive 601-based accelerator cards squeeze more performance out of Macs. *Sep 95, p. 67*

★ **EAB401P Speakers,** Panasonic Communications & Systems, 800/742-8086, $99. Small, inexpensive speakers provide less-than-state-of-the-art performance. *Apr 95, p. 58*

★★ **EAB701P Speakers,** Panasonic Communications & Systems, 800/742-8086, $249. The sound of these speakers is thin and slightly harsh. *Apr 95, p. 58*

★★ **LabTec LCS-3210,** Labtec, 360/896-2000, $169.99. Speakers have a harsh midrange and poorly implemented 3-D sound. *Dec 95, p. 84*

★★★★ **MMS557,** Audio-Technica USA, 216/686-2600, $149.95. These speakers look good and sound good. *Apr 95, p. 87*

★★★★ **MultiSpin 4Xe,** NEC Technologies, 708/860-9500, $515. This competitively priced quad-speed CD-ROM player is ready to race. *Feb 95, p. 81*

★★ **NEC AudioTower,** NEC Technologies, 708/860-9500, $99. Speaker system's sound quality is nothing to shout about. *May 95, p. 81*

★★★★ **Photo Engine,** Radius, 408/541-6100, $1099. Impressive Photoshop-acceleration hardware speeds up 25 Photoshop operations. *Feb 95, p. 57*

★★★★ **Reno Portable CD-ROM Player,** MediaVision, 510/770-8600, $349. Portable CD-ROM player is lightweight, versatile, and easy to set up. *Jun 95, p. 65*

★★ **Smart Label Printer EZ30,** Seiko Instruments USA, 408/922-5800, $199. Label printer's print quality and speed are disappointing. *Nov 95, p. 72*

★★★ **SoftBoard Model 205,** Microfield Graphics, 503/626-9393, $2795. Electronic whiteboard is expensive but does the job. *Jan 96, p. 71*

★★★ **Vivid 3D Pro,** NuReality, 714/442-1080, $149.95. Sound-enhancement system produces 3-D sound from a pair of speakers. *Aug 95, p. 87*

★★★★ **YST-SS1010,** Yamaha Corp. of America, 714/522-9240, $349.95. Satellite-and-subwoofer speaker system is highly recommended. *Jul 95, p. 79*

MODEMS/NETWORK HARDWARE

★★★ **GeoPort Telecom Adapter Kit,** Apple Computer, 408/996-1010, $129.95. Adapter unlocks the capabilities of Apple's GeoPort modem. *Oct 95, p. 75*

★★★ **Internet Server Solution for WWW,** Apple Computer, 408/996-1010, $2909. Web server is ideally suited for small-business sites. *Oct 95, p. 65*

★★ **Manta 500EN/Starfish Ethernet Access Point,** Digital Ocean, 913/888-3380, Manta $799; Starfish $1850. Wireless-communications package is capable but much too expensive. *Dec 95, p. 77*

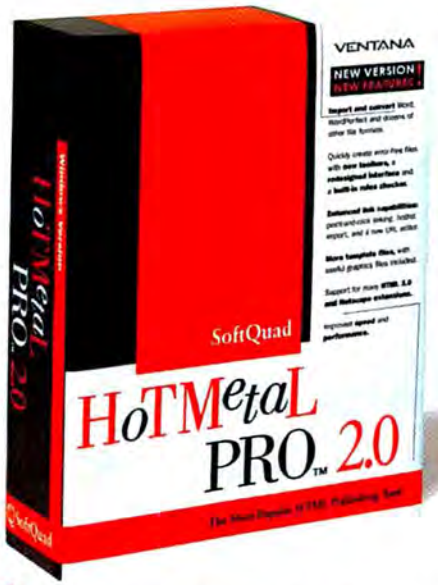
★★★★ **OneWorld Combo,** Global Village Communication, 408/523-1000, $1499 without modems; $2099 with modems. Server is the very model of a multiuser modem pool. *Sep 95, p. 78*

★★★★ **OneWorld Internet 1.0, 700 Series,** Global Village Communication, 408/523-1000, $1699 plus monthly fee. Internet gateway offers E-mail and Internet access in an approachable format. *Jun 95, p. 63*

★★★ **Power Class 28.8 Data/Fax Modem,** Motorola, 205/430-8000, $395. Fax modem's hardware is

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MacWEEK, September 1995

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NetGuide, November 1995

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World Wide Web Unleashed, 1994

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Star Ratings

superb, but it's hampered by mediocre software. *Oct 95, p. 89*

★★★★ **TelePort Platinum,** Global Village Communication, 408/523-1000, $279. Reliable fax modem includes call recognition and an answering machine. *Aug 95, p. 81*

PRINTERS

★★★★ **Apple Color StyleWriter 2200,** Apple Computer, 408/996-1010, $419. Portable ink-jet printer is ideal for color output when you're on the road. *Nov 95, p. 66*

★★★★ **Apple Color StyleWriter 2400,** Apple Computer, 408/996-1010, $525. Economical color ink-jet printer offers gorgeous output. *Apr 95, p. 63*

★★★★ **Fargo FotoFun,** Fargo Electronics, 612/941-9470, $399.95. Dye-sublimation printer produces good output at a reasonable price. *Jan 96, p. 61*

★★★★ **HP LaserJet 5MP,** Hewlett-Packard, 800/752-0900, $1299. Laser printer meets the high demands of small businesses and home offices. *Jul 95, p. 58*

★★★★ **LaserWriter 4/600 PS,** Apple Computer, 408/996-1010, $929. Compact printer produces great-looking 600-dpi output. *Dec 95, p. 60*

★★★★ **LaserWriter 16/600 PS,** Apple Computer, 408/996-1010, $2399. If speed is what you need, this reasonably priced printer is it. *Mar 95, p. 52*

★★ **Nikon Coolprint,** Nikon Electronic Imaging, 516/547-4355, $2350. Color dye-sublimation printer is fast, but print quality is flawed. *Sep 95, p. 83*

★★★ **Phaser 140,** Tektronix, 503/627-7111, $1695. Ink-jet is a capable color printer for a small workgroup. *Apr 95, p. 63*

★★★ **Pictura 310,** Fargo Electronics, 612/941-9470, $4995; optional Adobe Level 2 PostScript package $795. Printer produces acceptable print quality, but its color-matching capabilities are substandard. *Jul 95, p. 61*

★★★★ **StyleWriter 1200,** Apple Computer, 408/996-1010, $269. Newest model of Apple's ink-jet printer offers improved print quality. *Sep 95, p. 65*

★★★★ **Stylus Color,** Epson America, 310/782-0770, $699. Color ink-jet's print quality is superb and its price is reasonable. *May 95, p. 58*

★★★ **Typhoon 8,** Dataproducts, 818/887-8000, $3100 (600 dpi, 4MB of RAM); $5199 (1200 dpi, 36MB of RAM). Workgroup printer offers top-notch 1200-dpi output but is a bit pricey. *Dec 95, p. 64*

★★ **Xerox 4510ps,** Xerox, 800/349-3769, $1745. Printer has neither the performance nor the quality to justify its price. *Dec 95, p. 68*

SCANNERS

★ **Digital Fotovix IIIS-D,** Tamron Industries, 516/484-8880, $2299. Video slide scanner's image quality doesn't measure up to the competition. *Jan 96, p. 67*

★★★ **Fujitsu ScanPartner Jr.,** Fujitsu Computer Products of America, 408/432-6333, $499. Compact scanner with good OCR software is an economical scanning solution. *Jul 95, p. 63*

★★★★ **HP ScanJet 3c,** Hewlett-Packard, 208/323-2551, $1179. Economical scanner offers a broad tonal range and accurate colors. *Oct 95, p. 79*

★★ **Pro Imager 4000,** PixelCraft, 510/562-2480, $2995. Scanner delivers excellent highlight detail but produces noise in shadow areas. *Jun 95, p. 59*

★★★★ **Pro Imager 8000,** PixelCraft, 510/562-2480, $12,995. Demanding prepress users will like this scanner. *Jun 95, p. 59*

★★★ **Reli 4830T,** Relisys, 408/945-9000, $1699. If you can live with slow performance, this scanner is a bargain. *Jun 95, p. 71*

★★★★ **SprintScan 35,** Polaroid, 617/386-2000, $2495. Compact, efficient, cost-effective scanner transfers slides or negatives to a Mac. *Jun 95, p. 79*

★★★ **Vista-S8,** Umax Technologies, 510/651-8883, $995 (LE+); $1095 (Pro+). 24-bit color flatbed scanner has a lot of useful features for its low price. *Jul 95, p. 67*

SYSTEMS/STORAGE

★★★★ **Brainstorm Accelerator for the Macintosh SE,** Brainstorm Products, 415/988-2900, $199. If your budget won't buy a new Mac, consider this accelerator. *Mar 95, p. 67*

★★★ **Envoy Wireless Communicator,** Motorola, 800/894-7353, $1000 to $1500. Magic Cap–based PDA was our reviewers' first choice for E-mail. *Aug 95, p. 62*

★★★★ **EZ135,** SyQuest Technology, 510/226-4000, $249. Removable drive is fast and comes with a fine selection of bundled software. *Dec 95, p. 58*

★★★ **Joule System,** La Cie, 503/520-9000, Price

Macworld DIRECTORY

Hot new directory

Don't miss **Macworld Directory**, the **hottest** new section to hit *Macworld*. Macworld Directory is your one-stop buying resource, putting you in touch with the products and services you're looking for. You'll find Macworld Directory after the Macworld Shopper section.

varies by component. Plug-and-play tower lets you stack drives atop a base unit. *Feb 95, p. 73*

★★★ **Marco Wireless Communicator,** Motorola, 800/894-7353, $900 to $1400. Newton OS–based PDA includes a radio modem. *Aug 95, p. 62*

★★★ **Master CD Pro,** MicroNet Technology, 714/453-6000, $4995. Recordable CD-ROM drive is a good tool for professional CD production. *Aug 95, p. 83*

★★★ **MessagePad 120,** Apple Computer, 408/996-1010, $599, 2MB model $699. Apple's PDA is a good choice for specialized tasks. *Aug 95, p. 62*

★★★★ **Power 100,** Power Computing, 512/258-1350, $2599 (base model). Macintosh clone offers expandability, functionality, and compatibility. *Aug 95, p. 60*

★★★★ **Power Macintosh 7500/100,** Apple Computer, 408/996-1010, $3159. Strong video, sound, and networking capabilities characte[illegible] this model. *Dec 95, p. 56*

★★★ **Power Macintosh 8100/110,** [illegible] Computer, 408/996-1010, $6379. Power M[illegible]rs increased speed and improved NuBus circu[illegible]lar *95, p. 50*

★★★★ **Power Macintosh 8500/1[illegible]** [illegible]ple Computer, 408/996-1010, $4839 w[illegible] drive; $4299 w/1GB drive. This is the most[illegible]e-packed Mac ever made. *Jan 96, p. 52*

★★★ **Power Macintosh 9500/[illegible]** [illegible]le Computer, 408/996-1010, $5799. Pov[illegible] offers speed, expansion, and lots of memc[illegible]*5, p. 60*

★★ **RCD-1000,** Pinnacle M[illegible]4/727-3300, $1695. CD-Recordable drive is[illegible]o use but too unreliable for day-to-day backu[illegible] *95, p. 81*

★★★ **SledgeHammer8000FT,** FW[illegible]15/325-4392, $23,599. Level 5 RAID array provides constant access to your stored information. *Sep 95, p. 59*

★★★ **Sony Magic Link,** Sony, 800/571-7669, $699.95. Using this PDA is a breeze, but it lacks applications. *Aug 95, p. 62*

★★★★ **Zip Drive,** Iomega, 801/778-1000, $199.95; 100MB cartridge $19.95. External drive combines speedy performance, convenience, and economy. *Jul 95, p. 59*

VIDEO/DISPLAY

★★★★ **Apple Multiple Scan 15 Display,** Apple Computer, 408/996-1010, $509. Monitor provides a sharp and accurate image and good stereo sound. *Feb 95, p. 55*

★★★ **EAsycolor 24/1360,** EA Research, 510/867-0967, $1699. Video board offers Photoshop CMYK acceleration and multisync monitor support. *Aug 95, p. 64*

★★★ **Encoder Pro,** P2 Systems, 206/525-2081, $259. Inexpensive Mac-to-TV adapter is a good value. *Jan 96, p. 69*

★★★ **Kodak Digital Camera 40,** Eastman Kodak, 716/726-7260, $995. Digital camera can use 37mm lens but has some flaws. *Jan 96, p. 59*

★★★★ **Multiscan 15sf,** Sony Computer Peripheral Products, 408/432-0190, $569.95. Monitor displays sharp, bright, and accurate images. *Feb 95, p. 55*

★★★★ **MultiSync 3V Monitor,** NEC Technologies, 708/860-9500, $495. Monitor delivers a fine picture at a moderate price. *Feb 95, p. 55*

★★★ **PaintBoard Prism GT,** RasterOps, 408/562-4200, $999. Video board offers good QuickDraw acceleration but no Photoshop acceleration. *Aug 95, p. 64*

★★★★ **Panelight ZX,** Panelight Display Systems, 415/772-5800, $3995 to $4695. This LCD panel offers vivid images at a comparatively low price. *Mar 95, p. 77*

★★★★ **Presenter TView,** TView, 503/643-1662, $449. Reliable Mac-to-TV adapter produces an excellent picture. *Jan 96, p. 69*

★★★ **QA-1500,** Sharp Electronics, 201/529-8731, $5795. LCD panel's display is crisp, but placing a presentation on its PC Card is cumbersome. *May 95, p. 69*

★★★★ **QuickCam,** Connectix, 415/571-5100, $149.95. Tiny, fun, easy-to-use digital camera captures video. *Mar 95, p. 73*

★★★ **QuickTake 150,** Apple Computer, 408/996-1010, $739. Digital camera is easy to use and includes close-up lens. *Jan 96, p. 59*

★★ **Radius Telecast,** Radius, 408/541-6100, $9995. QuickTime-based video editor has potential, but software is not yet mature. *Jan 96, p. 65*

★★★★ **SpigotPower AV,** Radius, 408/541-6100, $999. Make full-screen movies with this first-rate video-compression board. *Jun 95, p. 67*

★★★★ **Targa 2000 1.2,** Truevision, 408/562-4200, $5495. Video board offers good picture quality and fully synced 16-bit audio. *Dec 95, p. 71*

★★★★ **Thunder IV GX 1360,** Radius, 408/541-6100, $2999. Video board provides impressive QuickDraw and Photoshop acceleration. *Aug 95, p. 64*

★★★ **VideoDirector 1.5,** Gold Disk, 408/782-0200, $199.95. Low-end video-editing system logs, edits, and organizes videotape footage. *Jun 95, p. 75* Ⓜ

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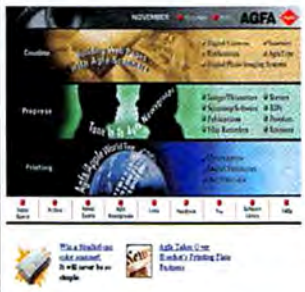
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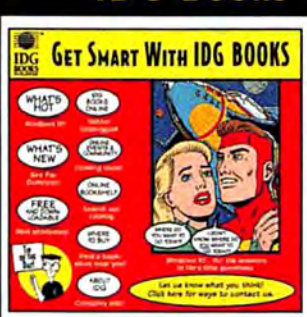
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Page No.	Advertiser	Reader Srvc. No.	Phone
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87	Apple Software-System 7.5	—	—
64	ATI Technologies Inc	257	905/882-2600
212,213	BottomLine Distribution/DGR Technologies	63	800/990-5792
13	Caere Corporation	69	800/535-SCAN
196-199	ClubMac	96	800/CLUB MAC
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189-191	Computer Discount Warehouse	2	800/861-4CDW
88	Connectix - RAM Doubler	192	800/839-3629
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92	Connectix - QuickCAM	191	800/839-3629
34	Corbis Corporation	74	—
89	Corel Corporation	78	800/836-3729
204,205	CRA Systems Inc.	20	800/375-9000
53	CTX International	102	800/289-8808
44	Dantz Development	26	800/225-4880
137	DataViz	79	800/780-1466
59	DayStar Digital	7	800/532-7853
22,23	Deneba Software	57	800/733-6322
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210	DigiCore	269	800/858-4622
223	Direct Connections	121	800/572-4305
200,201	DirectWare	88	800/490-WARE
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24,25	Epson America	—	800/BUY-EPSON
194,195	Express Direct	81	800/765-0020
60	Farallon Computing	—	—
76	Focus Enhancements	79	617/938-8088
163A,B	Fujitsu	202	800/831-4094
138	Global Village	—	800/736-4821
26	Graphsoft	46	410/290-5114
49	Hewlett Packard—DesignJet line	11	800/354-7622
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83	Intuit - Quick Books	—	800/781-6999
207	J&R Computerworld	282	800/221-8180
181	Jump Development Gro	132	412/681-2692
78	Kaetron Software	67	800/938-8900
BC	Kensington Microware Ltd.	1	800/535-4242
72	Kingston Technology	201	800/435-0677
206	L.A.Trade	—	800/433-3726
15-17	LaCie	52	800/999-1182
202,203	Mac Bargains	70	800/619-9091
214,215	Mac Zone	71	800/436-0606
37	MacAcademy	106	800/527-1914
192,193	MacConnection	—	800/800-3333
208,209	MacMall	131	800/222-2808
220	MacMarket	258	800/223-4622
141	MacPlay	159	800/4-MacPlay
148,149	Macromedia	244	800/326-2128
218,219	MacWarehouse	150	800/255-6227
184	Macworld Fax On Demand	—	—
221	MegaHaus	245	800/786-1184
9	MetaTools, Inc.	6	805/566-6200
20	MetaTools, Inc.	4	805/566-6200
29	MetaTools, Inc.	5	805/566-6200
28	Microfield Graphics	48	800/334-4922
IFC,1	Microsoft - Word	—	800/531-6748
171	NEC Technologies	—	800/NEC-INFO
IBC	NEC Technologies	16	800/NEC-INFO
63	Netcom On-Line	54	800/NETCOM1
80	Number Nine Visual Technology	53	800/438-6463
14	Orange Micro	33	714/779-2772
142	Parsoft International	127	214/479-1340
168	Performance Systems International	95	800/82PSI82
30,31	Pinnacle Micro	115	800/553-7070
75	Polaroid	295	800/816-2611
2	Power Computing Corporation	161	800/410-7693
211	ProDirect	135	800/524-9952
69	PSINet	104	—
111	QMS	288	800/392-7559
10	Reply Corporation	—	800/801-6898
32	Samsung Electronics America, Inc.	198	800/933-4110
95	Scanvec Inc	75	800/866-6227
143	Seiko Instruments	93	800/888-0817
173,174	Signature Software	300	800/925-8840
94	Sony Corporation	—	—
112,113	Sony Electronics	—	—
50	Specular International	41	800/433-7732
36	SPSS INC.	85	800/457-8287
150	Star Nine	3	800/525-2580
121	Tektronix	143	800/835-6100
6,7	Texas Instruments	266	800/527-3500
35	Umax	200	800/859-2728
146	usrEZ Software	36	800/482-4MAC
179	Ventana Media	129	800/743-5369
79	Viking Components	233	800/338-2361
11	Visioneer	18	800/787-7007
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222	Westwood Computers	101	800/761-1999
170	World Software	145	800/225-9299
91	Xante Corporation	112	800/926-8839

Macworld Product Index

A quick and easy product index from Macworld. Simply use this index to find the page or advertiser of the products which interest you. Then, use the reader service number for our FastFacts Product Information Card located on the following page.

Page No.	Advertiser	Reader Srvc. No.
SOFTWARE		
BUSINESS		
84	AEC Software	203
74	Inspiration Software	—
21	Intuit - Quicken	—
83	Intuit - Quick Books	—
78	Kaetron Software	67
IFC,1	Microsoft - Word	—
CAD/CAM		
77	Engineered Software	12
26	Graphsoft	46
CD ROM		
34	Corbis Corporation	74
89	Corel Corporation	78
COMMUNICATION		
137	DataViz	79
ENTERTAINMENT		
89	Corel Corporation	78
141	MacPlay	159
142	Parsoft International	127
FONTS		
147	Alsoft	140
173,174	Signature Software	300
GRAPHICS/DTP		
156,157	Adobe - Photoshop	251
158,159	Adobe - PageMaker	253
160,161	Adobe - Illustrator	252
147	Alsoft	140
22,23	Deneba Software	57
78	Kaetron Software	67
148,149	Macromedia	244
9	MetaTools, Inc.	6
20	MetaTools, Inc.	4
29	MetaTools, Inc.	5
95	Scanvec Inc.	75
50	Specular International	41
MISCELLANEOUS		
87	Apple Software—System 7.5	—
74	Inspiration Software	—
181	Jump Development Gro	132
164	Wall Data	103
MULTIMEDIA		
18	Diamond Multimedia	83
148,149	Macromedia	244
OCR		
13	Caere Corporation	69
ONLINE		
134	Apple Software-Internet Kit	—
168	Performance Systems International	95
69	PSINet	104
150	Star Nine	3
PERSONAL		
83	Intuit - Quick Books	—
21	Intuit - Quicken	—
SECURITY		
146	usrEZ Software	36
STATISTICAL		
36	SPSS INC.	85
UTILITIES		
88	Connectix—RAM Doubler	192
90	Connectix—Speed Doubler	193
44	Dantz Development	26
181	Jump Development Gro	132
179	Ventana Media	129
70	Westcode Software	195
WORD PROCESSING		
170	World Software	145
HARDWARE		
BOARDS		
64	ATI Technologies Inc	257
59	DayStar Digital	7
80	Number Nine Visual Technology	53
14	Orange Micro	33
10	Reply Corporation	—
COMPUTER SYSTEMS		
122,123	Apple Computer—PowerMac 9500	—
204,205	CRA Systems Inc.	20
194,195	Express Direct	81
2	Power Computing Corporation	161
222	Westwood Computers	101
DIGITIZERS/SCANNERS		
144	Agfa	158
67	Hewlett Packard—ScanJet line	—
35	Umax	200
DISPLAY		
204,205	CRA Systems Inc.	20
53	CTX International	102
IBC	NEC Technologies	16
75	Polaroid	295
32	Samsung Electronics America, Inc.	198
112,113	Sony Electronics	—
EXPANSIONS/UPGRADES		
59	DayStar Digital	7
206	L.A.Trade	—
79	Viking Components	233
FURNITURE		
12	Agio	—
HARD DISKS/STORAGE		
216,217	Alliance Peripheral Systems	62
212,213	BottomLine Distribution/DGR Technologies	63
196-199	ClubMac	96
223	Direct Connections	121
163A,B	Fujitsu	202
72	Kingston Technology	201
15-17	LaCie	52
221	MegaHaus	245
30,31	Pinnacle Micro	115
211	ProDirect	135
94	Sony Corporation	—
79	Viking Components	233
INPUT DEVICES		
BC	Kensington Microware Ltd.	1
28	Microfield Graphics	48
11	Visioneer	18
MICROPROCESSOR		
2	Power Computing Corporation	161
MISCELLANEOUS		
132,133	American Power Conversion	72
138	Global Village	—
NETWORKING		
43	Adaptec	—
60	Farallon Computing	—
POWERBOOK		
12	VST Power Systems	73
POWERBOOKS		
76	Focus Enhancements	79
PRINTERS		
24,25	Epson America	—
49	Hewlett Packard—DesignJet line	11
111	QMS	288
143	Seiko Instruments	93
121	Tektronix	143
6,7	Texas Instruments	266
91	Xante Corporation	112
SECURITY		
132,133	American Power Conversion	72
VIDEO		
92	Connectix - QuickCAM	191
ACCESSORIES		
FURNITURE		
8	Anthro	—
MISCELLANEOUS		
28	Microfield Graphics	48
SERVICES		
ON LINE		
93	CompuServe	66
63	Netcom On-Line	54
TRADESHOWS/CONFERENCES		
184	Macworld Fax On Demand	—
TRAINING		
37	MacAcademy	106
MAIL ORDER		
216,217	Alliance Peripheral Systems	62
212,213	BottomLine Distribution/DGR Technologies	63
196-199	ClubMac	96
189-191	Computer Discount Warehouse	2
210	DigiCore	269
223	Direct Connections	121
200,201	DirectWare	88
267	Educorp	157
194,195	Express Direct	81
207	J&R Computerworld	282
206	L.A.Trade	—
202,203	Mac Bargains	70
214	Mac Zone	71
215	Mac Zone	71
192,193	MacConnection	—
208	MacMall	131
209	MacMall	131
220	MacMarket	258
218,219	MacWarehouse	150
221	MegaHaus	245
211	ProDirect	135
222	Westwood Computers	101
WebWatch		
182	Adobe Systems	
182	Agfa	
182	Apple Computer, Inc.	
182	Blue Sky Research	
182	CDG Systems	
182	DirectWare	
182	Farallon Computing	
182	IDG Books Worldwide, Inc.	
183	Image Club Graphics	
183	Impossible Software	
183	MacLinQ	
183	Macworld Expo	
183	Macworld Online	
183	NetJet	
183	OnBase Technology	
183	The Software Source	
DIRECTORY		262-263

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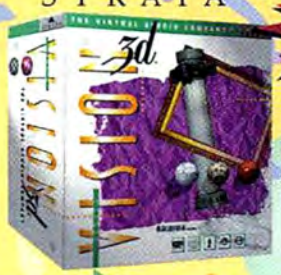
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16854	Sonic Micro Print/12	269.
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13509	Broderbund MYST CD	44.95
1720	Delorme Street Atlas USA CD	74.95
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3675	Starplay Crystal Caliburn	29.95
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- *Extended Keyboard*

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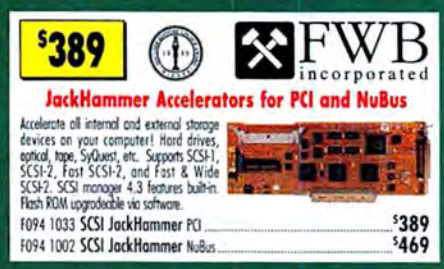












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850MB TrailBlazer	811MB	14ms	4500RPM	3 years	C109 1206/C109 1207	$219/279
1080MB Fireball	1042MB	12ms	5400RPM	3 years	C109 1202/C109 1203	$269/329
2200MB Capella	2103MB	8.5ms	5400RPM	5 years	C109 1213/C109 1212	$689/749
4300MB Grand Prix (BEST BUY)	4110MB	8.6ms	7200RPM	5 years	C109 1159/C109 1108	$999/1059
2.5" Hard Drive						
341MB Daytona (BEST BUY)	324MB	17ms	4500RPM	1 year	Q030 1041/C109 1119	$199/319
514MB Daytona	491MB	17ms	4500RPM	1 year	Q030 1002/C109 1109	$279/399
Seagate						
2.4GB Hawk 2 LP ST32430N	2295MB	9ms	5411RPM	5 years	C109 2211/C109 2112	$739/799
4.3GB Hawk 4 ST15230N	4105MB	9ms	5411RPM	5 years	C109 2212/C109 2113	$999/1059
2.5GB Barracuda 2 LP ST32550N	2043MB	8ms	7200RPM	5 years	C109 2203/C109 2109	$889/949
4.3GB Barracuda 4 ST15150N	4094MB	8ms	7200RPM	5 years	C109 2207/C109 2106	$1329/1389
5.25" Full Height						
9.1GB Elite 9 ST410800N	8669MB	11ms	5400RPM	5 years	5020 1014/C109 2110	$2299/2399
MICROPOLIS						
2.0GB Taurus-2 4221AV	1955MB	8.5ms	7200RPM	5 years	C109 1228/C109 1231	$809/869
4.3GB Capricorn-4 3243AV	4064MB	8.5ms	7200RPM	5 years	C109 1229/C109 1232	$1239/1299
9.1GB Scorpio 9 1991AV	8669MB	12ms	5400RPM	5 years	C109 1230/C109 1233	$2239/2299
HEWLETT PACKARD						
2.0GB SureStore 2000LP	2046MB	8.5ms	5400RPM	5 years	C109 1210/C109 1211	$679/739
IBM						
1080MB Deskstar XP (BEST BUY)	1032MB	10.5ms	5400RPM	5 years	C109 1237/C109 1238	$269/329

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4.3GB Barracuda 4 ST15150W	4094MB	8ms	7200RPM	5 years	C109 2206/C109 2208	$1399/1499
9.1GB Elite 9 ST410800W	8699MB	11ms	5400RPM	5 years	C109 2220/C109 2222	$2379/2499
Quantum						
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4.3GB Grand Prix XF34301SW	4110MB	8.6ms	7200RPM	5 years	C109 2216/C109 2218	$1069/1169
MICROPOLIS						
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S198 1012	200MB	$75ea	$73ea	$71ea
S198 1013	105MB	$35ea	$34.50ea	$34ea
S198 1014	270MB	$60ea	$59ea	$58ea
S198 2010	EZ135 Cartridge (135MB)			$19.99

iomega.

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ClubMac 30 DAY

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M274 1002	PlayWrite 2X 2000 CDR w/Gear MULT	$1289
M274 1003	PlayWrite 4X 4000 CDR w/Gear STD	$2599
M274 1004	PlayWrite 4X 4000 CDR w/Gear MULT	$2689

YAMAHA®

Y010 1002	4X CDR Recorder Toast CD Mastering Software	$2799

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P074 1008	RCD-5020 Recordable CD System	$1249

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'TORAY' Optical Storage Solutions

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T140 2001	TORAY PDM-650 Media (ZCAV 650MB)	$59

PINNACLE MICRO THE OPTICAL STORAGE COMPANY

P074 1005	Apex 4.6GB Optical	$1589
P074 1006	Apex 4.6GB 1024K Media	$189
P079 1003	Tahoe 230MB 3.5" Optical Drive	$659
P074 1004	Sierra 1.3GB Optical Hard Drive	$1829

MITSUBISHI CHEMICAL AMERICA

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V010 1021	Verbatim 1.3GB Cartridge (1024K)	$69
V010 1012	Verbatim 230MB Optical Cartridge	$29
V010 1013	Verbatim 230MB Formatted Optical	$32
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R016 1009	Radius Intellicolor Display/20e	$2099
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N026 1022	NEC 17" MultiSync XV17"	$739
N026 1007	NEC 17" MultiSync XE17"	$999
N026 1009	NEC 17" MultiSync XP17"	$1049
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N026 1011	NEC 21" MultiSync XP21"	$2159

SONY

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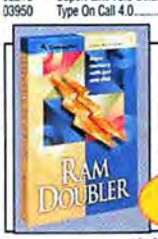
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Apple Macintosh IIvx & IIvi	4	68	512k	59			156		336			556		1580
Apple Macintosh Classic						153								
Apple Macintosh Color Classic	4	10	256k	34		78	168		278					
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Apple Performa 405, 410, 430	4	10				78	156		278					
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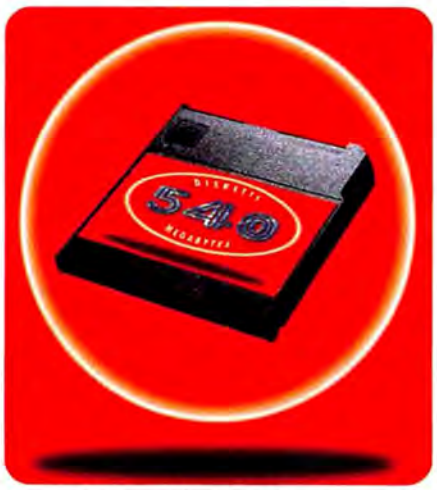
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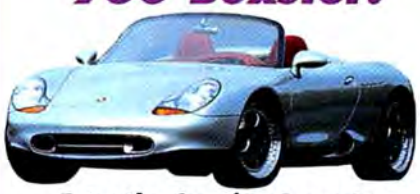
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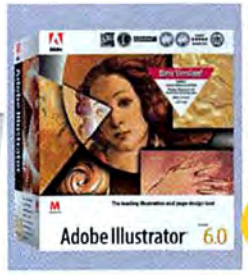
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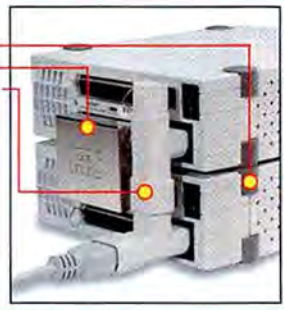


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APS Q 1080[3] Quantum 1080 Fireball	1042MB	MacWEEK ★★★★	269.95	349.95
APS ST 1080[3] Seagate ST51080N	1042MB		279.95	379.95
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APS ST 2.0[5] Seagate ST 32550N Barracuda	2047MB		849.95	949.95
APS MS 2.0AV[5] Micropolis 4221AV	1955MB		799.95	899.95
APS MS 4.0[5] Micropolis 3243	4064MB		1099.95	1199.95
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APS Q 4.0[5] Quantum Atlas XP34300	4101MB	MacWEEK ★★★★½	1299.95	1399.95
APS MS 9.0[5] Micropolis 1991	8669MB		2199.95	*2399.95
APS MS 9.0AV[5] Micropolis 1991AV	8669MB		2299.95	*2499.95
APS ST 9.0[5] Seagate ST410800N	8669MB		2199.95	*2399.95

[5]Denotes length of manufacturer's warranty in years
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APS DAT-DC[2] DDS-1 Compression Mechanism	4GB‡		$749.95	799.95
APS ProDAT[2] DDS-2 Non-Compression Mechanism	4GB×		849.95	899.95
APS HyperDAT[2] DDS-2 Compression Mechanism	8GB‡		949.95	999.95
APS DAT Loader600[2] Ideal for unattended large network backups	48GB‡‡		N/A	▼2299.95
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PRODUCT INDEX
BUSINESS TOOLS

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Category	Page No.
BUSINESS TOOLS	**224-227**
Bar Code	
Electronic Paper	
Point of Sale	
Presentation	
Real Estate	
EDUCATIONAL & RECREATIONAL	**255-257**
Astrology	
Discount Software	
Games	
Genealogy	
Grading	
Music	
Online Services	
Religion	
GRAPHICS	**258**
Clip Art	
MULTIMEDIA & CD-ROM	**254-255**
NETWORKING & COMMUNICATIONS	**248**
BBS	
PROGRAMMING & UTILITIES	**255**
Languages	
SERVICES & SUPPLIES	**258-260**
Computer Insurance	
Computer Repair	
Data Recovery	
Slides	
SYSTEMS & PERIPHERALS	**227-248**
Switch Box	
UPGRADES & MEMORY	**248-253**
Memory Upgrades	

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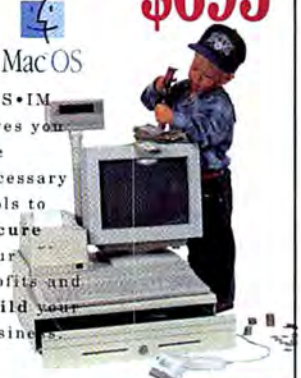
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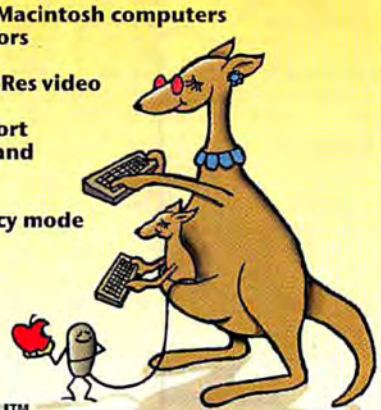
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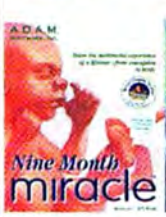
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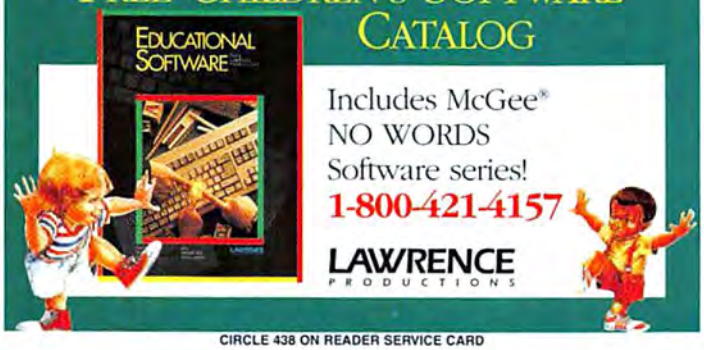
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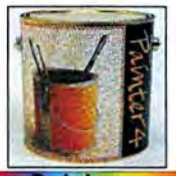
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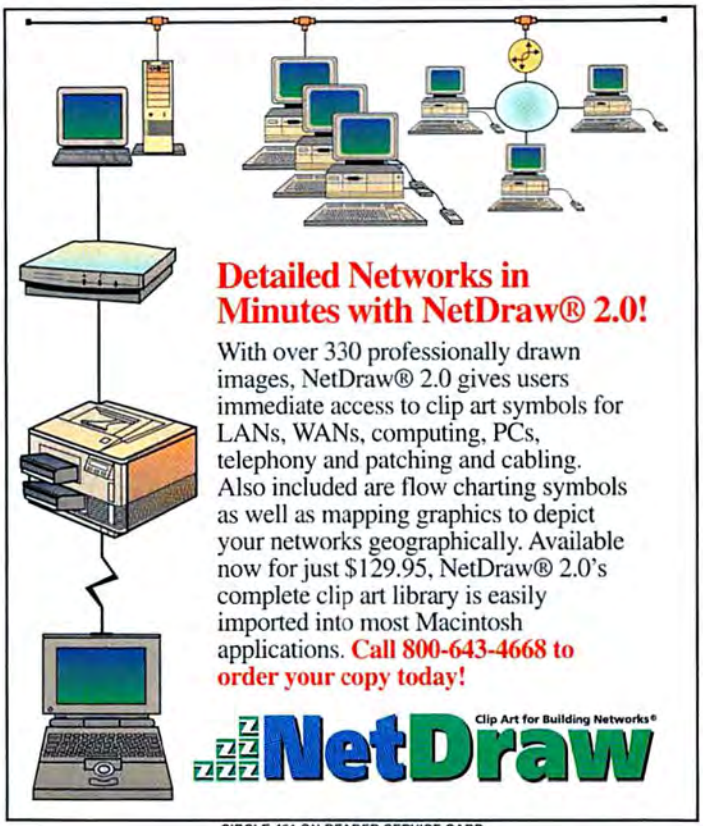
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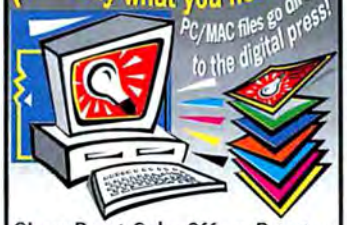
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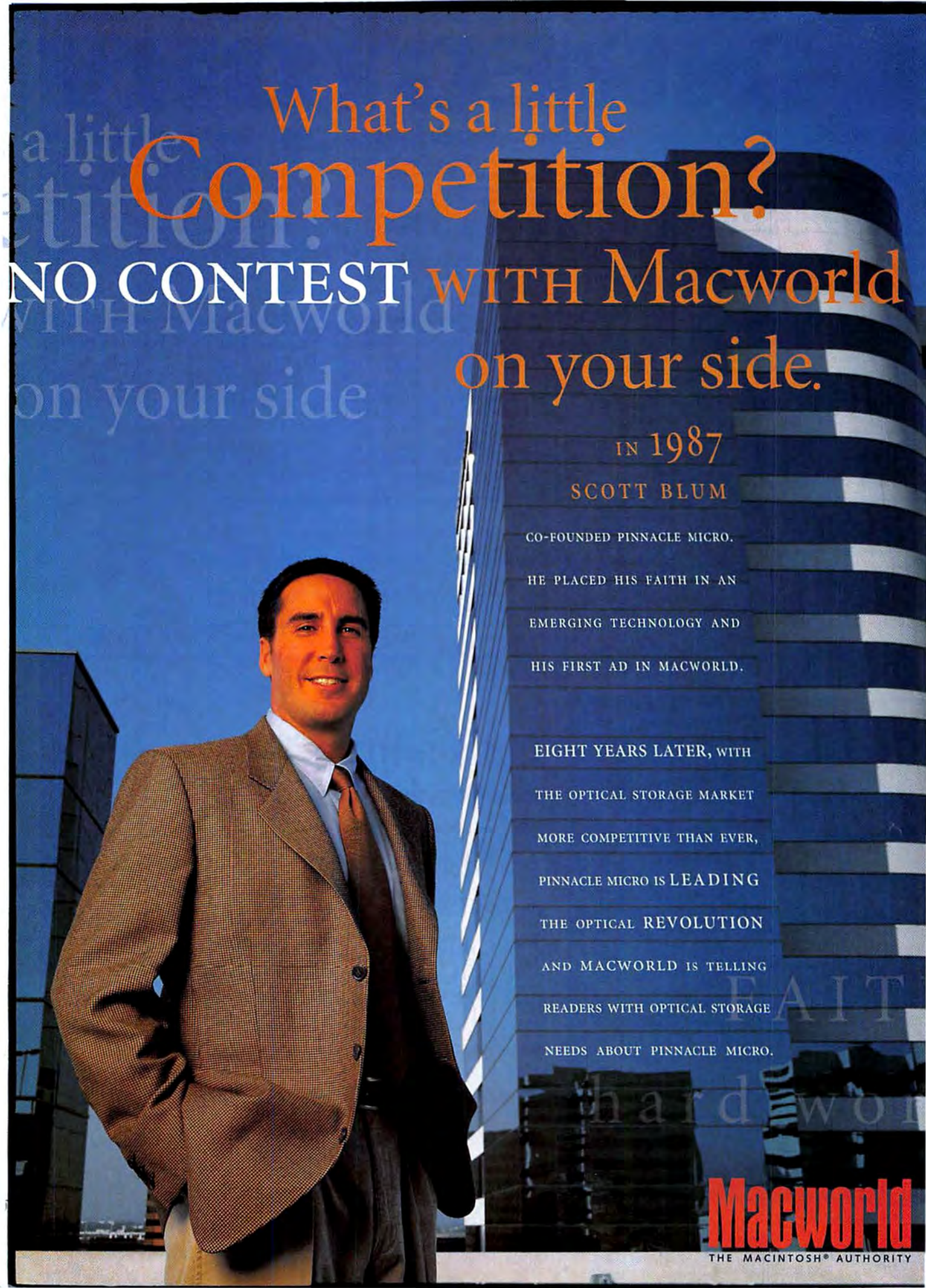
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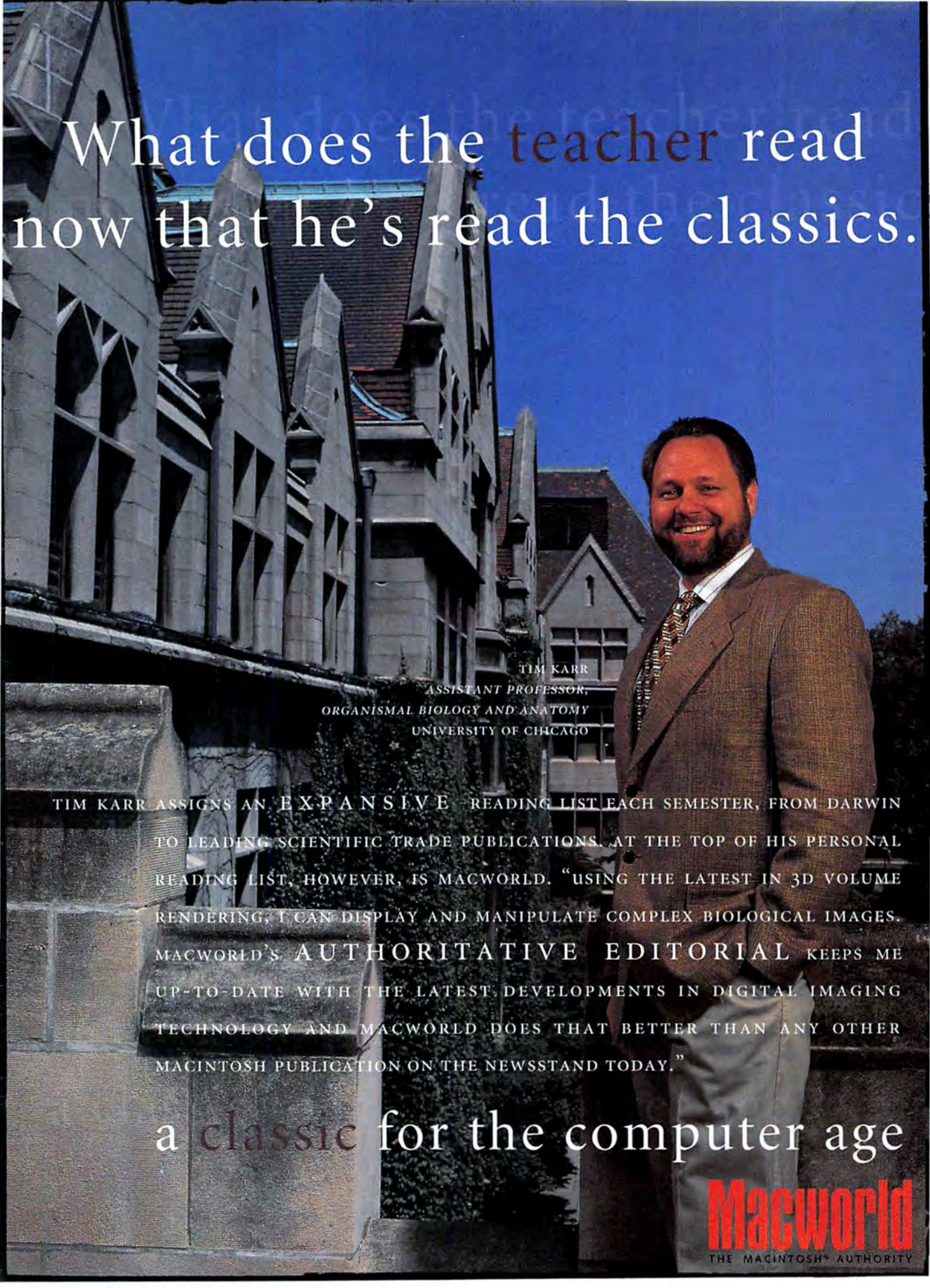
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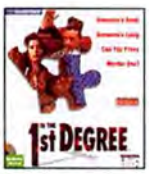
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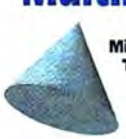
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by Caryn James

Why Hollywood Loves Killer-Computers

ARE WE A NATION OF CLOSET TECHNOPHOBES?

ON A RECENT EPISODE of *Homicide*, a detective questioned a murderer-arsonist, "How'd you get so good at setting fires?"

"On the Internet," the murderer answered. "Where else?"

It was a throwaway line, but a revealing one. News stories may depict us as a nation eager to embrace every new technological wonder, but movies and television convey a more suspicious attitude.

In 1995 alone five films depicted computers as the embodiment of evil, threatening to take over everything that makes us civilized: intelligence, emotions, Social Security numbers. Some even kill. Movies and television hint that we are a nation of secret technophobes, distrustful of technology hurtling toward us faster than we can cry "Stop!"

In *Virtuosity*, Sid 6.7, a computer-generated serial murderer, moves from virtual reality into plain old reality. In *Johnny Mnemonic*, a high-tech messenger has a computer chip implanted in his brain, about to explode. And the protagonist of the futuristic action film *Strange Days* sells black-market discs that send data rushing to your brain to re-create human experience—in this case, torture and murder.

Hackers has a computer-literate thief who threatens to turn someone into a stranger with a police record. In *The Net* computers steal Sandra Bullock's Social Security number and do turn her into a stranger with a police record. Everywhere, computers are turning truth into lies, generating killers, threatening to make our brains go haywire. Nowhere does a nice friendly computer wear tennis shoes and do something heroic.

The Wire-head in the Mirror

Pop culture doesn't have anything good to say about people who love computers too much, either. Hackers are usually shown as pathetically lonely misfits. They are like the nerds on the quickly canceled sitcom *Dweebs*, or like Bullock's character in *The Net*, a computer expert who works out of her house, orders pizza by E-mail, and apparently hasn't seen a living person in years. And that's their good side. Often computer experts are like the evil programmer who built Sid 6.7 out of the personalities of hundreds of serial killers.

It makes sense that filmmakers would pounce on a hot subject like computers. It doesn't necessarily follow that technology should be so destructive in movies. Why all these killer-computers?

The answer speaks to a gulf between those who are computer literate and those



who are still wide-eyed at an ATM. We villainize what we don't understand, and to many people computers are so baffling they seem ominous. These films play to a technophobia many people experience but are embarrassed to acknowledge: fear that everyone else understands computers; fear that computers will somehow take over our lives; fear of the unknown. If the computer expert in *The Net* can't prevent what's happened to her, what hope is there for the rest of us?

Whether such vile activities are realistic is always beside the point on screen. The *Homicide* detective never asks whether it's possible to become an expert arsonist on the Internet. The fear is enough.

Of course, computers are not the real villains. People must feed them information; computers have no will of their own. Sure, that's what they said in 1968 about HAL in *2001: A Space Odyssey*, the granddaddy of killer-computer movies. And HAL, programmed to think and talk like a person, managed to kill a few astronauts. These films express a deep, irrational fear that computers can outsmart us. The ultimate villain is HAL's descendant, a renegade computer-generated personality who's human enough to *decide* to kill.

The Fatal Snooze Factor

Most of last year's killer-computer movies flopped, and deserved to; they were boring, relying too much on self-congratulatory high-tech graphics and too little on plot and character. The more the film focuses on the human response to computer technology, the better it is. But these films' main failure is that they had no idea what they wanted to say about computers, much less to whom they were saying it. Visually and in their marketing, they played to the chic, acceptable idea that the audience is enamored of computers. Yet the films' own embarrassingly technophobic plots say otherwise.

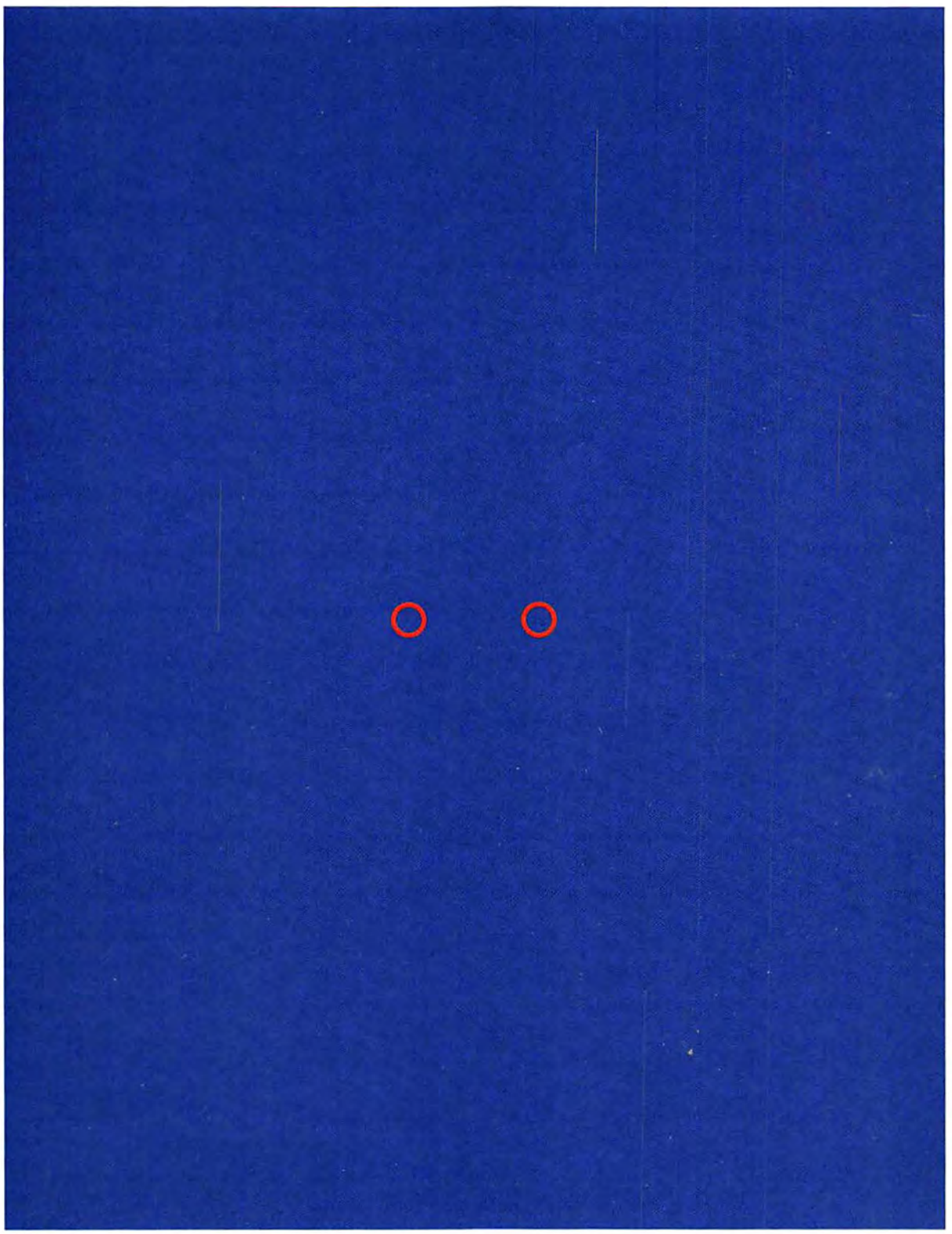
Oddly enough, the serial-killer film *Copycat* comes closest to being computer friendly. In it, an agoraphobic expert on serial murderers relies on the Internet to talk to the outside world. And it is through the Internet, which she calls "an open window," that the killer contacts her.

Copycat's computer is as neutral as a window or a telephone—just one more way of seeing and communicating. Maybe the best computer movies will be those that don't view technology as heroic or villainous, but accept it as part of everyday life. Such acceptance means losing your fear of card-chomping ATMs, but that's another issue. **m**

CARYN JAMES is a *New York Times* film critic.

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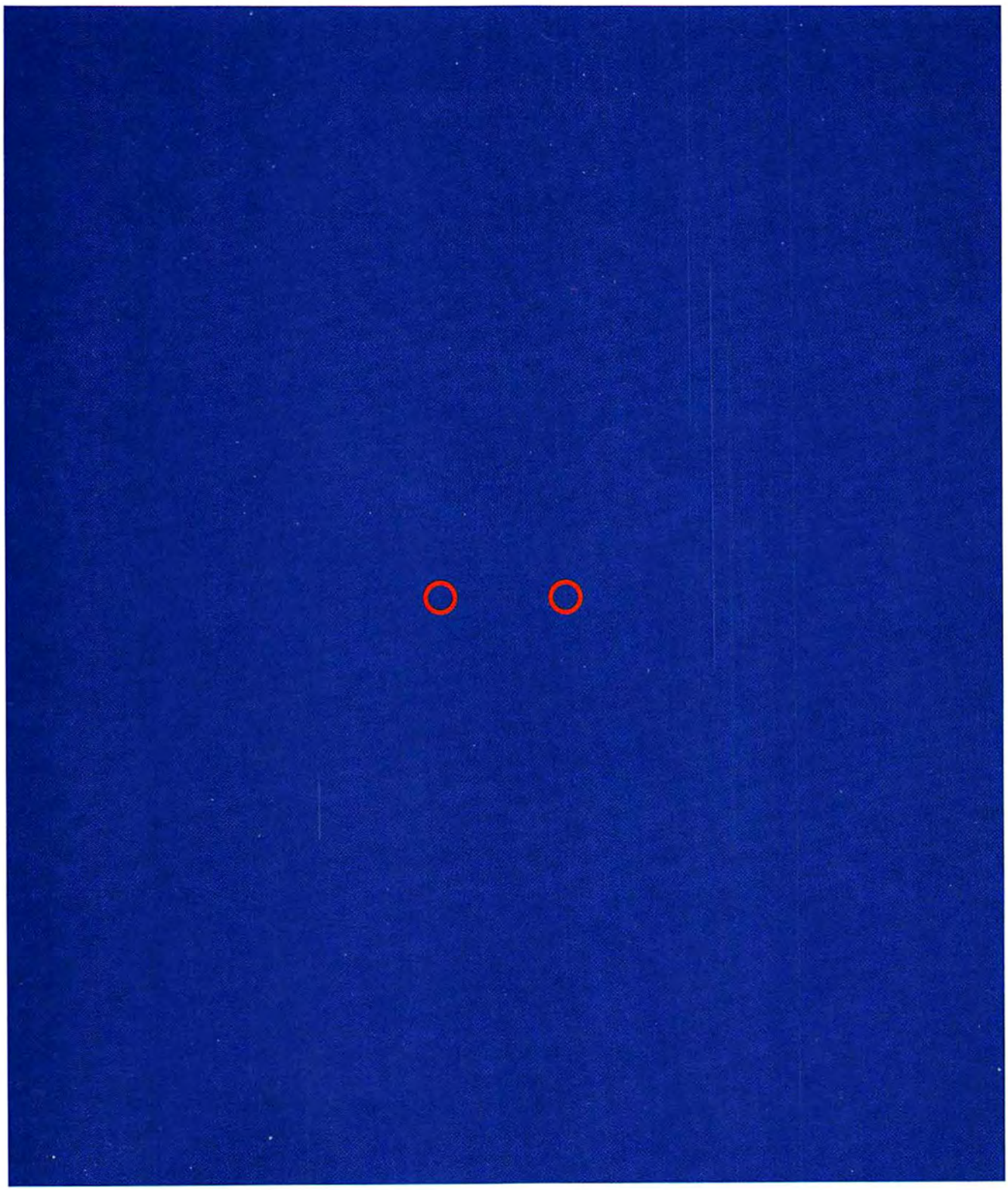
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